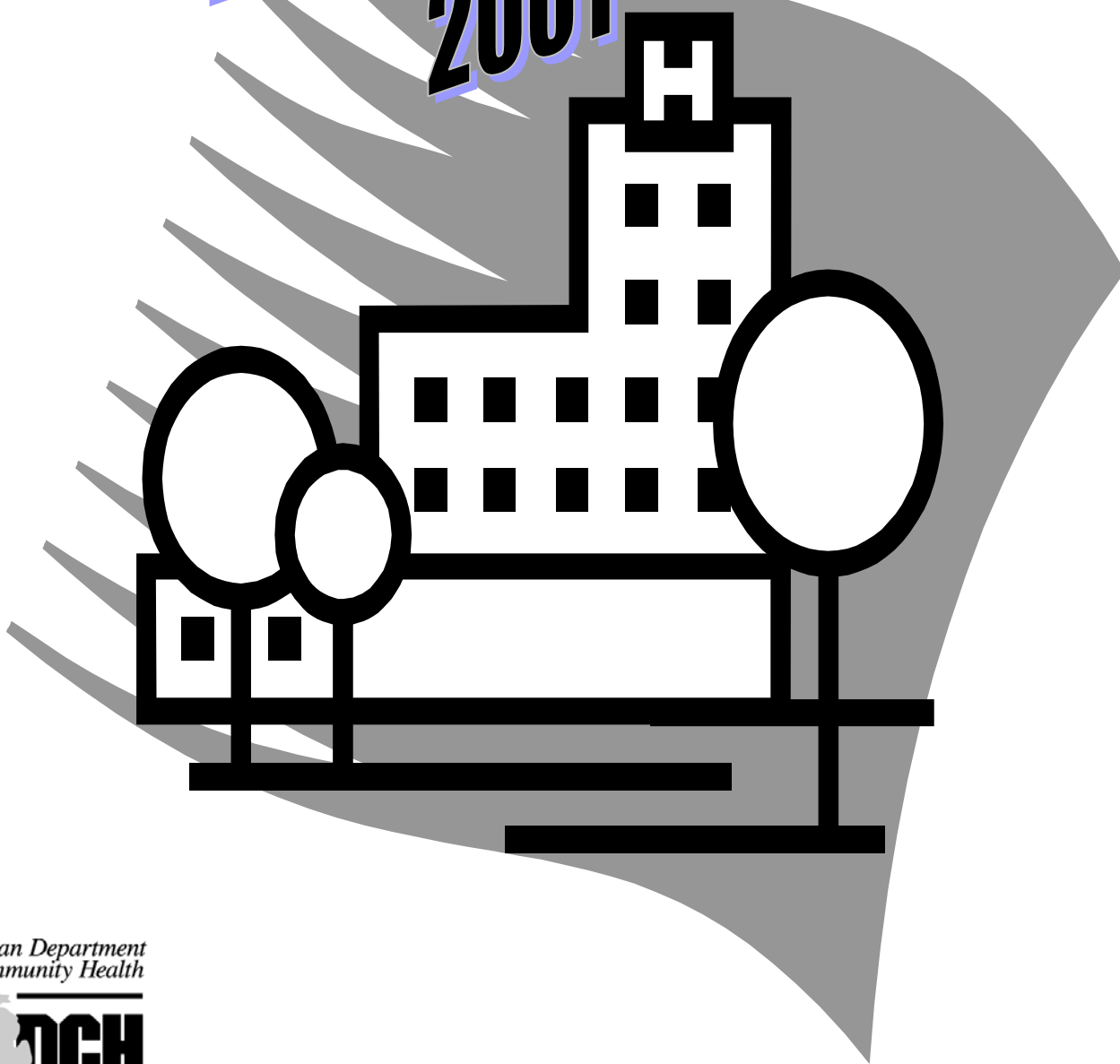


Michigan Injury Hospitalizations 2001



*Michigan Department
of Community Health*



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December 2003

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EXECUTIVE SUMMARY

This report examines Michigan resident injury hospitalizations for 2001. The age, sex, county of residence and the types of injuries sustained were analyzed. The cause of injury, which is a critical piece of information for injury prevention purposes, was also examined. A previous study on Michigan injury hospitalizations (1999) included a cause of injury analysis for Wayne County. This report contains cause of injury analyses for 23 counties and the City of Detroit. Each of these areas met the standard set by the Michigan Department of Community Health of providing cause of injury codes (E-codes) for at least 90% of injury inpatients.

This report utilized data from the Michigan Inpatient Database (MIDB). The Michigan Department of Community Health obtains annual MIDB data from the Michigan Health and Hospital Association, which is responsible for data aggregation and maintenance. The report utilized national recommendations that were released in 2003 for definitions and analysis format. Key findings of the report are as follows:

GENERAL

- In 2001, there were 56,528 Michigan resident hospitalizations for which the principal diagnosis was injury. This corresponds to an injury hospitalization rate of 565 per 100,000 residents.
- Injury hospitalizations comprised 4.4% of the 1,281,616 hospitalizations for any condition among Michigan residents in 2001.
- More than half of the patients (57%) had routine discharges, 2.4% died prior to discharge, and most of the remainder (39%) were transferred to another facility or sent home under care of home health services.

DEMOGRAPHIC CHARACTERISTICS

- The hospitalization rate for males was 7% greater than the hospitalization rate for females.
- The hospitalization rate for males was greater than that for females for each age group between birth and age 64. For every age group thereafter, females had higher rates.
- After age 69, hospitalization rates increased dramatically with age for both sexes. The hospitalization rate for those aged 85 and older was more than eight times the overall rate.

GEOGRAPHIC DISTRIBUTION

- Residents in the western Upper Peninsula and in the east central region of the Lower Peninsula had the highest rates of injury hospitalization.
- Of the ten most populous counties in the state, Genesee County had the highest rate of injury hospitalization. The rate for Genesee County exceeded the statewide rate by 35%.

TYPES OF INJURIES

- About one in six injury hospitalizations were for hip fracture making this the most common type of injury.
- Ten percent of injury inpatients had traumatic brain injury as their principal diagnosis.

CAUSES OF INJURY

- An E-code indicating the cause of injury was provided for 48,052 of the 56,528 Michigan resident injury hospitalizations (E-coding rate: 85.0%).
- Of the hospitalizations for which an E-code was provided, unintentional injuries comprised 83%, assaults 6.2%, intentional self-harm/suicide attempts 8.8%, and 1.7% were of undetermined intent or otherwise classified.
- E-coding rates varied widely by county of residence, from 39% to 99%. There was no clear geographic pattern of high or low E-coding counties.
- In each of the 24 areas for which a cause of injury analysis was performed, unintentional falls were the leading cause of injury. For most of these areas, falls caused about half of all injuries.
- Assaults caused nearly one-quarter of injury hospitalizations among Detroit residents. Among the other areas examined, assaults caused at most 6% of injury hospitalizations.
- Poisoning was by far the leading mechanism for those intentionally harming themselves.

OCCUPATIONAL INJURIES

- Workers' compensation was the payment source for 3.7% of injury hospitalizations. Because workers' compensation is not utilized as a payment source by everyone who is injured at work, the number of occupational injuries requiring hospitalization was likely understated in this study.
- Males had an occupational injury hospitalization rate nearly four times that of females. While the rate for males was fairly consistent after age 19, the rate for females increased with age and in fact surpassed the rate for males for those aged 65 and older.
- Of the counties with the five highest occupational injury rates, four are located contiguous to or near Saginaw Bay.
- Of Michigan's ten most populous counties, Genesee County had the highest occupational injury hospitalization rate by a substantial margin. The rate for workers who lived in Genesee County was 55% greater than the statewide rate.
- Compared to all injury inpatients, those who were injured at work sustained a greater proportion of upper limb fractures, open wounds, sprains/strains, and burns, but a lower proportion of hip fractures and poisonings.

Questions or comments concerning this report or requests for additional copies should be directed to Linda Scarpetta, Michigan Department of Community Health, at (517) 335-8397 or e-mail at scarpettal@michigan.gov.

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INTRODUCTION

Injuries are a significant public health issue in Michigan. In 2001, 5,297 Michigan residents died from injuries (including unintentional injuries, suicides, and homicides)¹ making injury the fourth leading cause of death in the state.² Deaths are the most serious and prominent outcome of injuries, but most injuries are not fatal. In Michigan, for every death due to injury, there are approximately 10 hospitalizations and more than 200 emergency department visits.*

The Injury Prevention Program (IPP) in the Michigan Department of Community Health has sponsored three statewide reports on injury mortality^{1,3,4} and one on injury hospitalization.⁵ This report utilizes cause of injury information to a greater extent than the first injury hospitalization report. Information on causes of injury (e.g., car crash, suicide attempt) is crucial to developing well-targeted prevention strategies. However, hospitalization data in Michigan have historically provided incomplete coding of injury causation. In an effort to maximize the use of this information while avoiding the presentation of data with a high level of missing values, cause of injury profiles were developed only for those counties with the most complete information. As cause of injury data become more complete, the IPP anticipates analyses in subsequent reports to include more counties.

DATA SOURCES AND METHODS

Data Sources

The Michigan Inpatient Database (MIDB) was the source of data on injury hospitalizations. The MIDB is the aggregation of hospital discharge data voluntarily provided to the Michigan Health and Hospital Association (MHA) by virtually every acute care hospital in Michigan (one very small hospital does not provide data). In addition, hospitals in contiguous states (Indiana, Ohio, and Wisconsin) submit data on hospitalized Michigan residents to MHA.

Estimates for the 2001 Michigan population⁷ were used to calculate state and county-level population-based hospitalization rates. The Bureau of Labor Statistics, U.S. Department of Labor provided data on the number of employed residents at the state and county level for 2001.⁸ These data were used to calculate worker-based hospitalization rates for occupational injuries.

Methods

An “injury hospitalization” was defined as a Michigan resident hospitalized for an injury in Michigan or a contiguous state (Indiana, Ohio, and Wisconsin). Out-of-state residents hospitalized in Michigan were excluded. An “injury” was defined as a hospitalization for which the principal diagnosis was among the following ICD-9-CM⁹ codes: 800.0-909.2, 909.4, 909.9, 910.0-994.9, 995.50-995.59, 995.80-995.85. ** This range was based on the recommendations made by a panel of national injury surveillance experts.¹⁰ Excluded are certain adverse effects (995.0-995.4, 995.6, 995.7, 995.89), and complications of surgical and medical care (996.0-

* In 2000, there were 5,263 injury deaths, 54,738 injury hospitalizations and approximately 1.1 million visits to emergency departments for injury among Michigan residents. (The estimate for ED visits is based on there being 3,764,457 total ED visits in 2000 (per the Michigan Health and Hospital Association) and that approximately 28.8% of all ED visits are for injury⁶.)

** The 1999 injury hospitalization report excluded codes 905-909 (late effects of injury) and 958 (early complications of trauma); these codes are included here. Had the 1999 definition been used in this 2001 report, there would have been 220 less cases.

999.9). Adverse effects of medical care are generally considered to be outside the scope of public health injury prevention programs.

Patients were limited to those discharged from a hospital between January 1, 2001 and December 31, 2001. Patients admitted to a hospital more than once for the same injury (i.e., readmissions) were not excluded (see discussion below). Patients who died during their hospitalization were included.

Injury diagnoses were categorized according to the Barell Matrix,¹¹ a two-dimensional array of ICD-9-CM codes grouped by body region and nature of injury. Use of this matrix was recommended by the national injury surveillance workgroup. The Barell Matrix and the ICD-9-CM codes defining each cell are presented in Table C-1 in Appendix C.

ICD-9-CM contains supplementary codes with which to specify the external cause of injury and poisoning. These “E-codes” indicate both the mechanism (e.g., struck by blunt object) and the intentionality (e.g., assault) of the injury cause. According to coding rules, an E-code should be assigned to every case involving an injury or poisoning (ICD-9-CM 800-999). In 1991, the rate at which injury hospitalizations were E-coded in Michigan was 51.9%.¹² By 2001, this had increased to 85.0%. Analyzing the causes of injury is crucial to developing well-targeted prevention efforts. However, it is unknown if the characteristics of the cases for which information on injury cause is not provided are similar to the characteristics of cases for which this information is provided. Therefore, great care must be taken when presenting cause of injury information when E-coding is incomplete.

For this report, we limited cause of injury analyses to counties whose residents were E-coded at 90% or greater. This approach allows for important cause of injury information to be presented while minimizing errors associated with missing data. In addition, a cause of injury profile for the state was developed even though the rate was below 90% because high E-coding counties were geographically well distributed throughout the state, minimizing the likelihood of an overall bias.

Some medical records contain more than one E-code. An algorithm for selecting the E-code to represent each record was provided by the national injury surveillance workgroup. That group also provided recommendations for calculating E-coding rates. For more detail on these methodologies, please see the reference paper.¹⁰ Note that the national workgroup recommended excluding E-codes E869.4 (Accidental poisoning by secondhand tobacco smoke) and E967.0-E967.9 (Child and adult battering and other maltreatment) from the numerator in E-coding rate calculations. This study included these codes as they do provide information on injury cause. (Of the 48,052 total E-coded cases, two were coded E869.4 while 88 were coded E967.0-E967.9.)

A framework for presenting cause of injury information has been developed by the U.S. Centers for Disease Control and Prevention (CDC)¹³ (see Table D-1 in Appendix D for this framework). This matrix illustrates the cause and intent of each injury event and the E-codes that define each cell. Cells within this table that are shaded indicate that no ICD code exists for that category.

Hospitalization rates were calculated by dividing the number of hospital discharges by the appropriate population and multiplying by 100,000. For the analysis on occupational injuries, the population used was the number of people employed. Rates were calculated only when based on 6 or more discharges. Rates based on less than six discharges were considered unreliable because the relative standard error (standard error x 100 / rate) exceeded 40%. Asterisks identify these cases in the tables.

A geographical analysis was performed allowing for comparison of county injury rates. Age adjustment was utilized to eliminate differences in crude rates between the counties that may have been due to differing age distributions. A substantial number of counties had insufficient numbers of cases (less than six) to perform standard age adjustment which requires parceling cases into eleven age groups. To increase the number of counties for which valid rates could be calculated, the number of years within each age group was increased. This reduced the number of age groups from eleven to three: ages 0-24, 25-64, 65 and older. Age adjusting with only three age groups seems reasonable given that a report¹⁴ by the National Center for Health Statistics on age-adjusting methods provides several examples using these same age groups.

Geographic analyses also were performed for two specific types of injury: hip fracture and traumatic brain injury. Since hip fracture incidence is strongly associated with age, varying age distributions across counties could account for differing hip fracture hospitalization rates. Thus, age adjustment is warranted. However, due to small cell sizes in many counties, age adjustment was not a valid strategy, even using three broad age groups as described above. As a next-best approach, the hip fracture analysis was limited to those over age 65.* Incidence of traumatic brain injury also varies by age and age adjustment would be appropriate here too. Again, due to small cell sizes, this was not feasible. Also, because rates were high among the very young and the elderly, it was felt that no one age group could be selected for use in the geographical analysis. Thus, the county-specific rates for TBI reflect crude rates for all ages.

Michigan county rates were mapped using ArcView (software designed by ESRI). With the exception of the map illustrating E-coding levels, rates were categorized into four groups using the “equal interval” classification method. In this method, the range of hospitalization rates was divided into four equal sub ranges. For example, if the lowest county rate was 26 per 100,000 and the highest county rate was 125 per 100,000, the four sub ranges would be: 26-50, 51-75, 76-100, and 101-125. In each geographical analysis, the quartile representing the highest rates contained the fewest counties. Thus, this methodology highlighted the relatively few counties with rates much higher than the state rate. Rates were not calculated for counties with less than 6 resident discharges due to the high statistical variability of these rates. These counties were marked by asterisks in the maps. Figure 5, which illustrates E-coding rates by county, utilized three categories reflecting “low”, “medium”, and “high” rates of E-coding.

Michigan residents who were hospitalized more than once for the same injury in 2001 were counted for each hospital discharge. Optimally, these cases would have been counted once to reflect injury incidence. However, there was no way to reliably sort out readmissions (due to missing values and different interpretations across hospitals for coding the Readmission field) or to identify patients treated in different hospitals for the same injury because the MIDB does not contain personal identifiers. There is some evidence that patients who are readmitted for the same injury differ from those who are admitted only once per injury. One study found that females were readmitted to a greater degree than males and that readmission rates varied by age, with readmission most likely for those over age 75.¹⁶ One injury researcher, who examined the Readmission variable in the MIDB for 1997,¹⁷ estimated the prevalence of readmissions at 5%.**

* The National Center for Health Statistics found a significant effect of age adjusting within the 65 and older age group.¹⁵ While performing this age adjustment would be beneficial, doing so for hip fractures would greatly limit the number of counties that could be included in the analysis.

** The researcher found that 5.2% of records had a value in the Readmission field indicating that the visit was a readmission. He assumed that cases for which this field contained missing values were not readmission visits. (Readmission data were missing for 83% of the records.) In other states, he estimated the prevalence of readmission between 3.8% (1997 Vermont) and 8.4% (1994 Missouri).

Because subsequent hospitalizations for the same injury incident could not be excluded, the rates presented in this report represent rates of injury hospitalization, not injury incidence.

Analyses involving patient race were not performed because information on race is typically unavailable for a large percentage of discharges in the MIDB. For the 2001 MIDB, race was unknown for 19% of the discharge records. In addition, citing the complexities regarding the collection of racial information, the national injury surveillance panel does not recommend performing this analysis.

The terms “hospitalization” and “discharge” are used interchangeably in the report and should be considered synonymous.

RESULTS

In 2001, there were 56,528 Michigan resident hospitalizations for which the principal diagnosis was injury. This corresponds to an injury hospitalization rate of 564.9 per 100,000 residents. Injury inpatients comprised 4.4% of the 1,281,616 Michigan residents hospitalized for any reason. Nearly all (98.0%) of the injury discharges were from Michigan hospitals. More than half (57.2%) of these patients had routine discharges (home or selfcare), more than one third (39.2%) were transferred to another type of facility or institution, and about one in forty (2.4%) died prior to discharge (Table 1).

TABLE 1
Number of Injury Hospitalizations
By Discharge Disposition
Michigan Residents, 2001

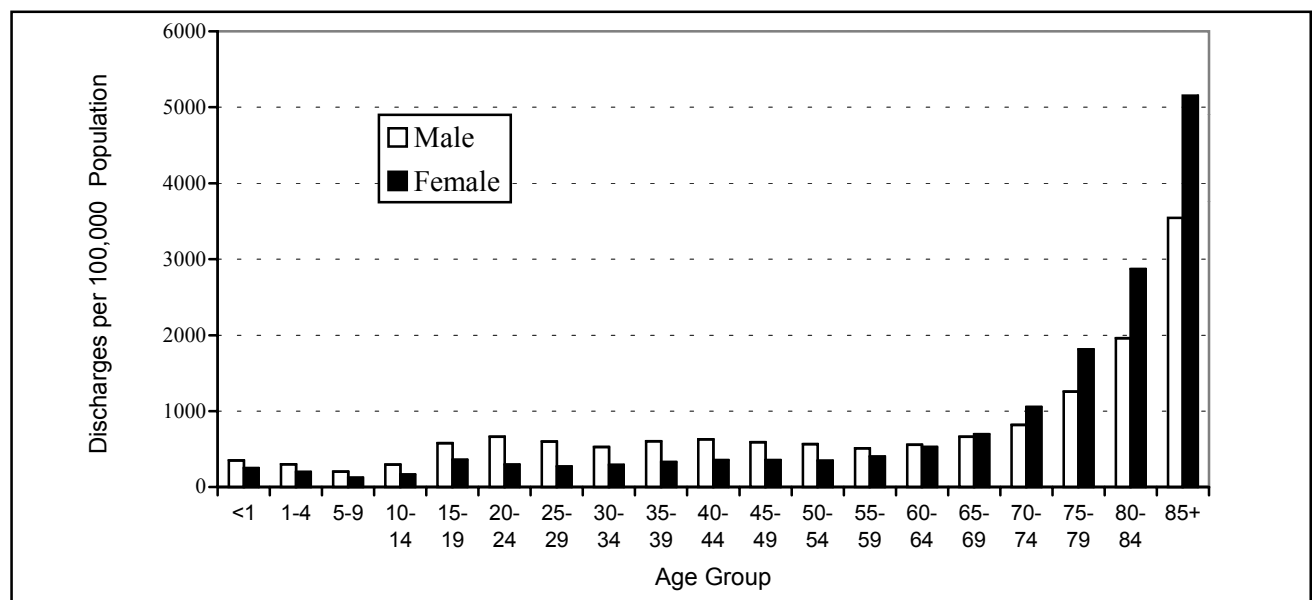
Discharge Disposition	Number	%
Home or selfcare	32,351	57.2
Transfer	22,169	39.2
<i>to another short term general hospital</i>	1,278	2.3
<i>to nursing skilled facility</i>	7,785	13.8
<i>to an intermediate care facility</i>	1,036	1.8
<i>to another type of institution</i>	8,004	14.2
<i>to home under care of home health services</i>	4,066	7.2
Left against medical advice or discontinued care	610	1.1
Other Disposition or Missing Data	43	0.1
Died	1,355	2.4
Total	56,528	100.0

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

Demographics of Injury Inpatients

The hospitalization rate was higher for males than females up through the 60-64 year old age group (Figure 1). For every age group thereafter, the rate for females was greater. Rates were lowest for those aged 5-9 years and highest for those aged 85 and older. Among those over age 64, injury rates increased dramatically with each subsequent five-year age interval. (See Table A-1 in Appendix A for age and sex specific rates.)

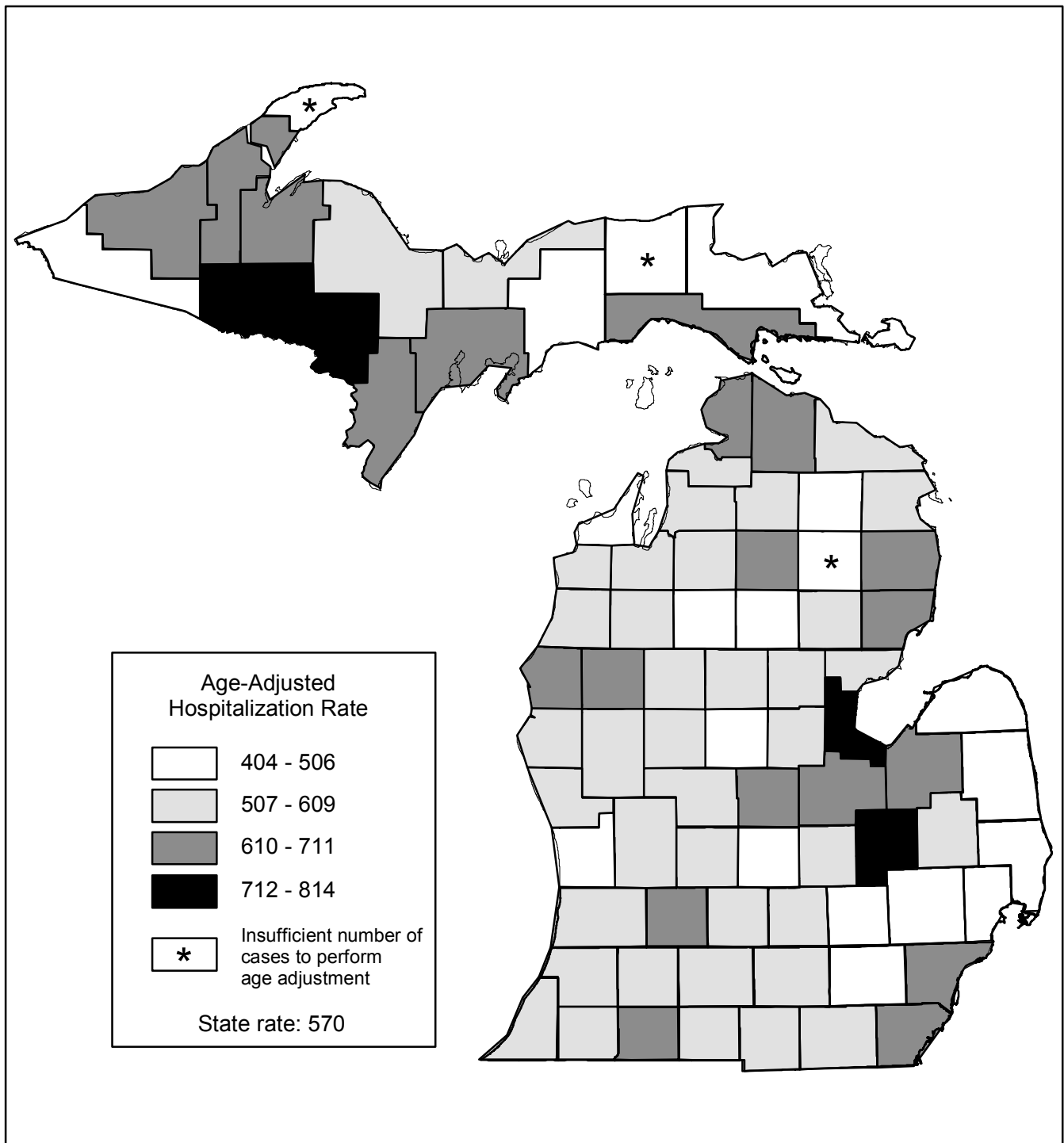
FIGURE 1
Rate of Injury Hospitalization
By Age and Sex
Michigan Residents, 2001



Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
U.S. Census Bureau, Population Estimates Branch

The variation of injury hospitalization rates by county of residence is illustrated in Figure 2. Note that these rates have been age-adjusted meaning that differences in injury rates cannot be explained by differences in county age distributions. Bay County had the highest age-adjusted injury rate, followed by Iron, Genesee, and Dickinson. These four counties comprise the highest rate group and are illustrated in black in Figure 2. Among the state's ten most populous counties, Genesee had the highest age-adjusted rate followed by Saginaw and Wayne. (See Table A-2 in Appendix A for crude rates and age-adjusted rates for all counties.)

FIGURE 2
Age-Adjusted Hospitalization Rates for All Injuries
By County of Residence, Michigan, 2001



Hospitalization rates are the number of hospital discharges per 100,000 population.

Injury hospitalizations are discharges with a principal diagnosis code in the following range per ICD-9-CM: 800.0-909.2, 909.4, 909.9, 910.0-994.9, 995.50-995.59, 995.80-995.85.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

Types of Injuries Sustained

Major types of injuries are illustrated by body region in the Barell Matrix (Table 2). Fractures were the leading type of injury, comprising 55% of the principal diagnoses. Nearly a third (31%) of the fractures were to the hip. Ten percent of injury hospitalizations were for traumatic brain injury (TBI).^{*} Most of these (79%) were Type 1 TBI, the most severe injury group. Twenty-three cases were Shaken Infant Syndrome.

Geographic Profile of Selected Injury Types

Traumatic Brain Injuries

There were 5,526 hospitalizations of Michigan residents in which traumatic brain injury (TBI) was the principal diagnosis.^{**} This corresponds to a statewide rate of 55.2 per 100,000 residents. Rates varied from 27.5 per 100,000 Livingston County residents to 116.1 per 100,000 Iron County residents. (Rates were not calculated for ten counties that had less than six discharges.) Three counties in addition to Iron had rates in the top quartile: Alcona, Baraga, and Mackinac (Figure 3). Note that the four counties in the top quartile were among the state's least populous. Thus, while they had high rates, each of them had less than twenty cases. Among the state's ten most populous counties, Genesee County had the highest rate (84.1 per 100,000). (See Table A-3 in Appendix A for all county-specific TBI hospitalization rates.)

Hip Fractures, Ages 65 and Older

There were 8,382 hospitalizations of Michigan residents aged 65 and older in which hip fracture was the principal diagnosis. This represented 88% of hip fractures among all ages. The corresponding hip fracture rate was 683.3 per 100,000 residents aged 65 and older. Rates varied from 277.0 per 100,000 Arenac County residents to 1,077.9 per 100,000 Gratiot County residents. (A rate was not calculated for one county that had less than six discharges.) In addition to Gratiot County, Lapeer, Luce, Marquette, and Ontonagon comprised the top quartile (Figure 4). (See Table A-4 in Appendix A for all county-specific hip fracture hospitalization rates.)

^{*} There are important differences as to how TBI is defined in this report and how it was defined in the 1999 Michigan injury hospitalization report.⁵ This report includes ICD-9-CM codes 950.1-950.3 and 995.55 (not included in the 1999 definition) and excludes 959.01 (included in the 1999 definition).

^{**} It is likely that the number of true TBI hospitalizations was greater than 5,526 in 2001. Some hospitalizations that normally would be identified as TBI via ICD-9-CM code 854 ("Intracranial injury of other and unspecified nature") may have been coded as 959.01 ("Head injury, unspecified"), which was added to ICD-9-CM in 1997. The CDC notes that this type of misclassification has been occurring in a substantial number of cases.¹¹ In Michigan, the number of hospitalizations coded with 854 dropped noticeably starting in 1998 (by nearly 50%).

TABLE 2
Number of Injury Hospitalizations By Body Region and Injury Type, Principal Diagnoses, Michigan Residents, 2001

Body Region	Fracture	Dislocation	Sprain/ Strain	Internal	Open Wound	Amputation	Blood Vessels	Contusion/ Superficial	Crush	Burn	Nerves	Unspecified	TOTAL
Brain - Type 1 TBI ¹	966			3,377							0		4,343
Brain - Type 2 TBI ²	190			780									970
Brain - Type 3 TBI ³	213												213
Other Head					143					13	6	516	678
Face	1,077	0	0		351					80			1,508
Eye					219			63		10	5		297
Neck	8		0		91				1	18	4		122
Head, Face, Neck Unspecified							42	200	0	116	0	26	384
Cervical Spinal Cord (SCI)	143			108									251
Thoracic/Dorsal SCI	68			16									84
Lumbar SCI	55			12									67
Sacrum Coccyx SCI	0			3									3
Spine & Back Unspecified SCI	0			28									28
Cervical Vertebral Column (VCI)	439	97	107										643
Thoracic/Dorsal VCI	593	3	15										611
Lumbar VCI	1,006	39	106										1,151
Sacrum Coccyx VCI	149	5	0										154
Spine & Back Unspecified VCI	9	0											9
Chest	1,228	0	11	1,442	63		43	233	2	70	1		3,093
Abdomen				1,665	137		20	86		38	4		1,950
Pelvis & Urogenital	1,887	12	76	95	78		2	15	2	5	0		2,172
Trunk	3				5			42	1	25	0	182	258
Back & Buttock			10		21			71	1	80			183
Shoulder & Upper Arm	2,207	99	1,005		59	5		32	4	55		11	3,477
Forearm & Elbow	1,627	19	13		154	8		12	11	65			1,909
Wrist, Hand & Fingers	361	19	10		471	155		22	32	178		10	1,258
Other & Unspecified Upper Extremity	0				16	1	80	15	1	49	74	3	239
Hip	9,505	82	82					211	0				9,880
Upper Leg & Thigh	2,005	0				3		47	3	60			2,118
Knee	436	159	194					48	1	8			846
Lower Leg & Ankle	5,975	20	113			12		77	19	111			6,327
Foot & Toes	854	24	4		143	23		28	9	145			1,230
Other & Unspecified Lower Extremity	2		262		427	4	58	46	3	54		74	930
Other/Multiple	4						2			11	10		27
Unspecified	0	0	36	6	3		0	65	0	14	7	14	145
System-wide & Late Effects													8,970
TOTAL	31,010	578	2,044	7,532	2,381	211	247	1,313	90	1,205	111	836	56,528

1. Type 1 Traumatic Brain Injury: recorded evidence of an intracranial injury or a moderate or a prolonged loss of consciousness (LOC), shaken baby syndrome or injuries to the optic nerve pathways.

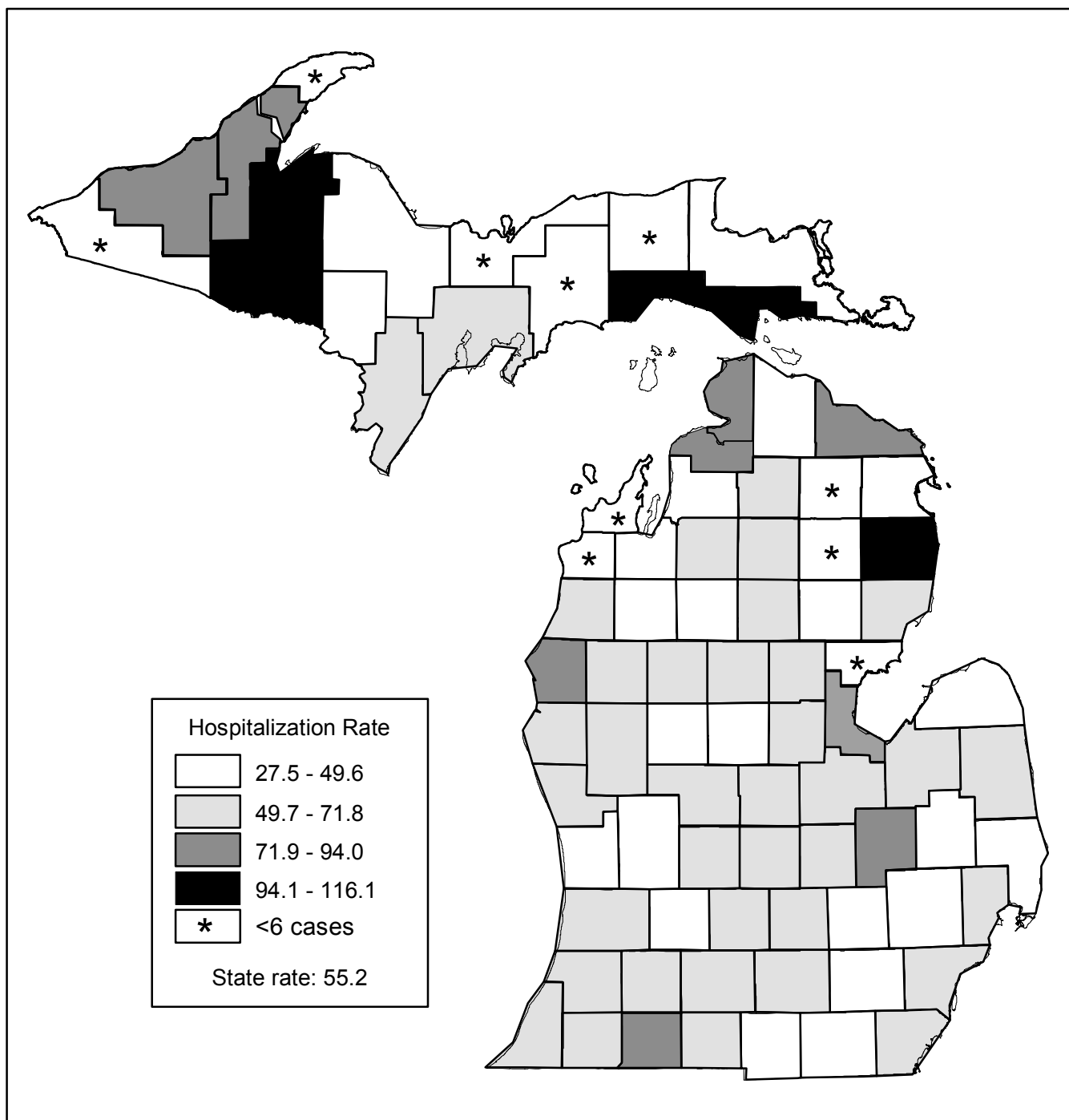
2. Type 2 Traumatic Brain Injury: injuries with no recorded evidence of intracranial injury, and LOC of less than one hour, or LOC of unknown duration, or unspecified LOC.

3. Type 3 Traumatic Brain Injury: Patients with no evidence of intracranial injury and no LOC.

See Table C-1 in Appendix C for ICD-9-CM codes defining cells in this matrix.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

FIGURE 3
Hospitalization Rates for Traumatic Brain Injuries
By County of Residence, Michigan, 2001



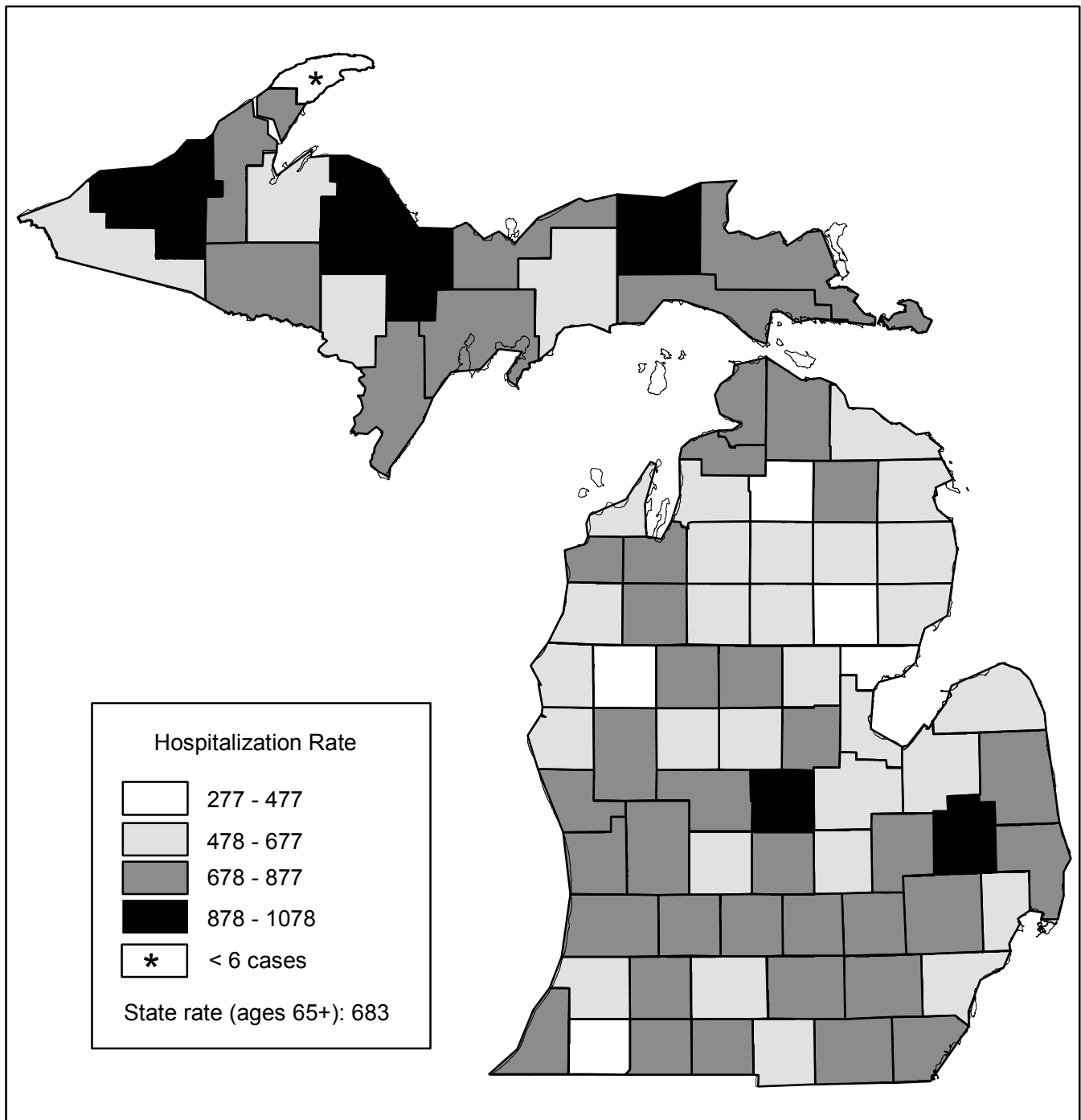
Hospitalization rates are the number of hospital discharges per 100,000 population.

Traumatic brain injuries are discharges with a principal diagnosis code in the following range per ICD-9-CM: 800, 801, 803, 804, 850-854, 950.1-950.3, 995.55.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

U.S. Census Bureau, Population Estimates Branch

FIGURE 4
Hospitalization Rates for Hip Fractures, Ages 65 and Older
By County of Residence, Michigan, 2001



Hospitalization rates are the number of hospital discharges per 100,000 population.

Hip fractures are discharges with a principal diagnosis code in the following range per ICD-9-CM: 820.0 - 820.9.

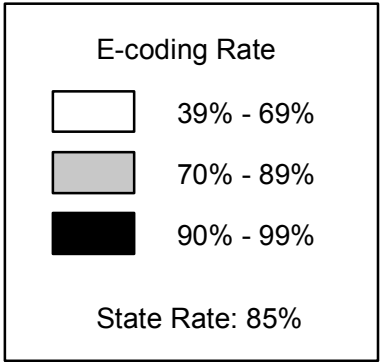
Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Bureau

Causes of Injury

An E-code indicating the external cause of injury was provided for 48,052 of the 56,528 Michigan resident hospital discharges in 2001. This 85.0% E-coding rate indicates that the rate continues to improve in Michigan (e.g., in 1999, it was 83.5%). The Michigan Department of Community Health has maintained that the statewide E-coding rate be at least 90% before in-depth analyses of injury causes are performed. MDCH is concerned about using incomplete data because cases that are coded may not be representative of all injury cases. Note that medical epidemiologists at the Centers for Disease Control and Prevention who were involved in developing national recommendations for injury surveillance using hospital discharge data¹⁰ consider a 90% E-coding rate very high and strongly encourage examining those data.¹⁸

Figure 5 illustrates the variability of E-coding rates by county of residence. Rates ranged from 39% to 99%. Twenty-three counties and the City of Detroit had an E-coding rate of at least 90% (these are illustrated in black in Figure 5). No geographic pattern is clearly apparent in Figure 5 – counties with low rates were distributed across the state as were counties with high rates.

FIGURE 5
E-coding Rates by County of Residence
Michigan Resident Injury Hospitalizations, 2001



Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

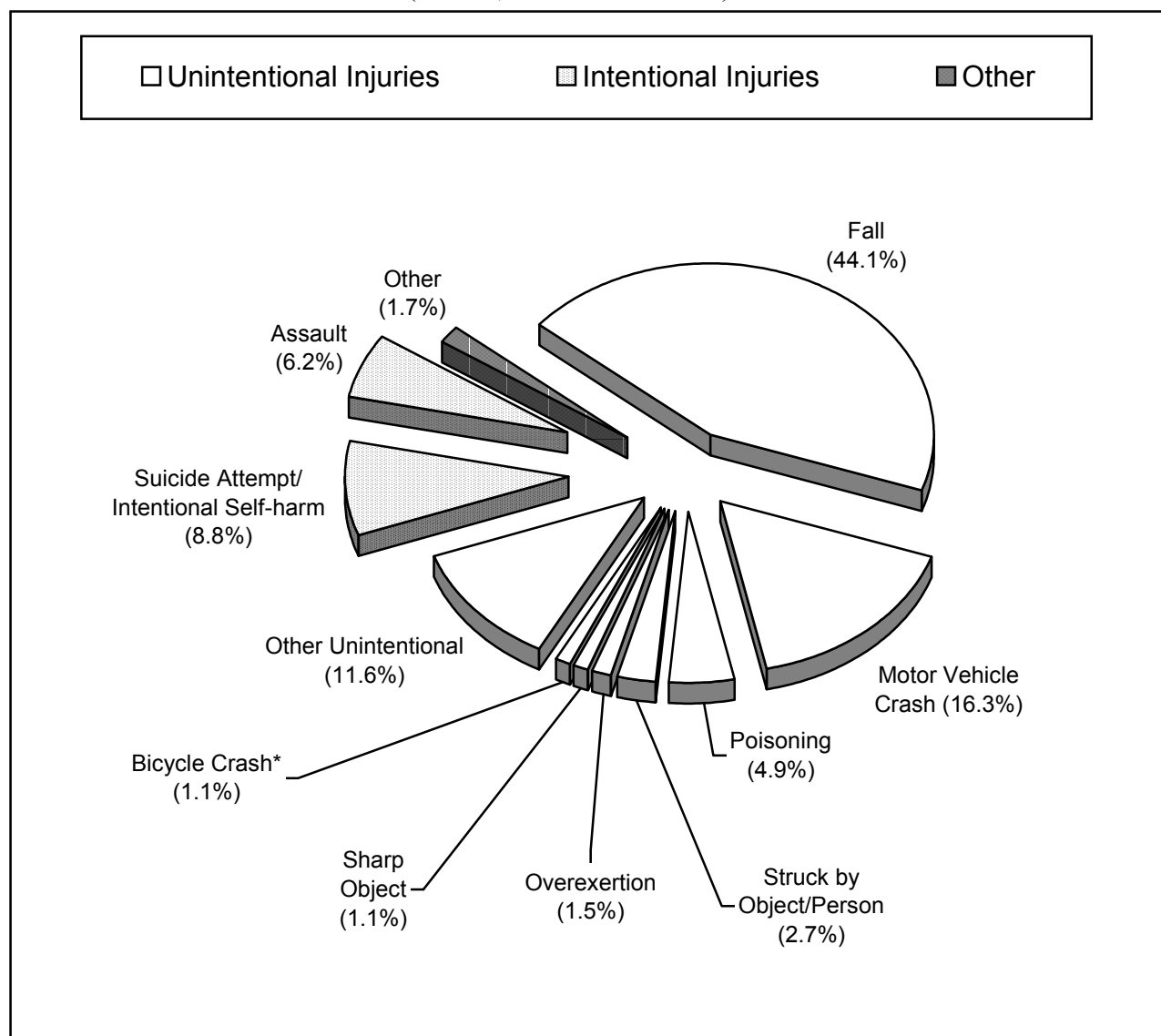
Michigan

An overall cause of injury profile for the state was developed (Figure 6) because of the geographical distribution of E-coding rates. [Such a profile might have been less reliable had all or most of the high E-coding counties been clustered together as cause of injury can be strongly associated with county of residence). Per the MDCH standard noted above, however, an in-depth analysis was not performed at the state level.

The following should be noted about Figure 6:

- Unintentional injuries comprised 83% of all E-coded injury hospitalizations.
- There were more hospitalizations for suicide attempts/intentional self-harm injuries than for assaults.
- Unintentional falls were by far the leading cause of injury.
- Among motor vehicle crashes, three quarters of those injured were vehicle occupants. Pedestrians and motorcyclists each comprised 10%.
- Nearly three quarters of bicycling-related injuries did not involve a collision with a motor vehicle (bicyclists injured in motor vehicle crashes are included among the Motor Vehicle Crash category in Figure 6).

FIGURE 6
Causes of Injury Hospitalization
Michigan Residents, 2001
(N = 48,052 E-coded cases)



* Excludes bicycle-motor vehicle crashes.

E-coding rate for Michigan: 85%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

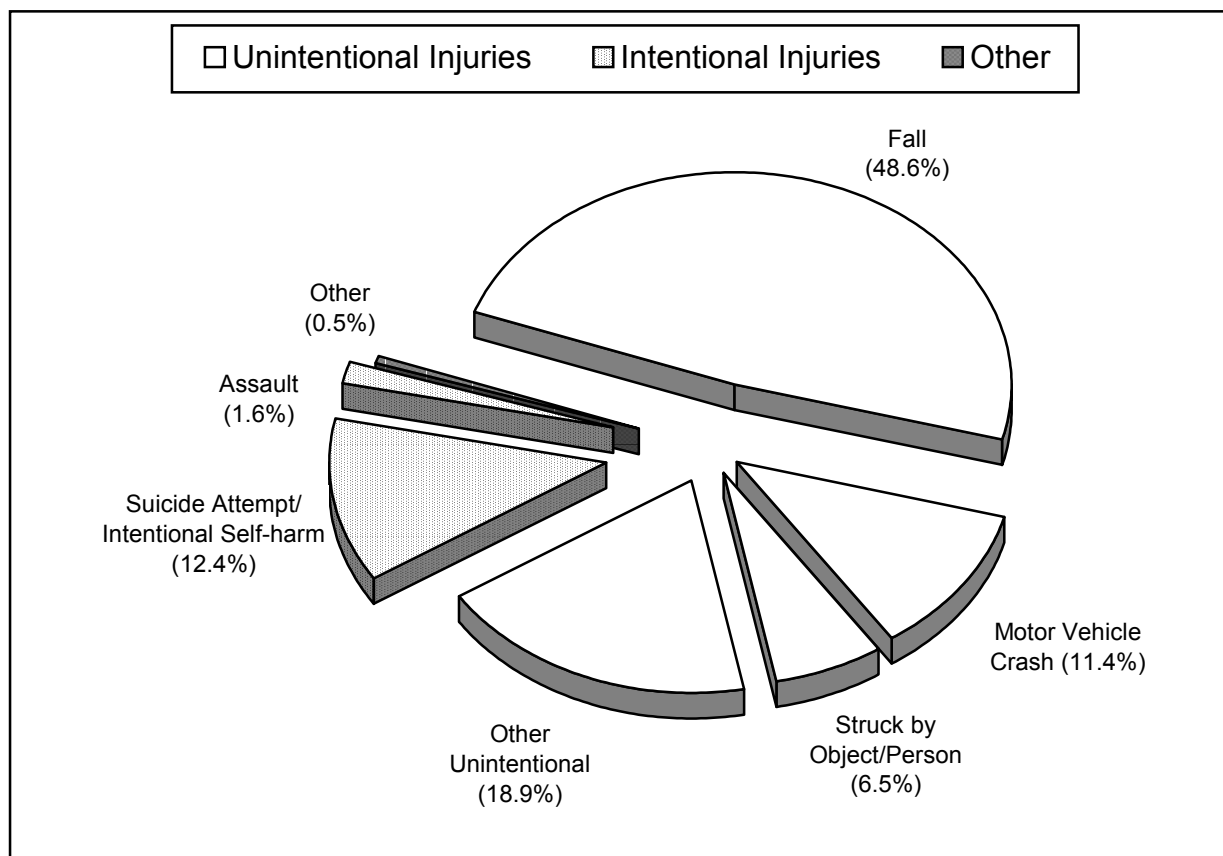
Counties With At Least 90% Cause of Injury Coding

Brief cause of injury analyses were performed for those counties that had E-coding rates of 90% or higher (22 counties, Wayne out-county, and the City of Detroit). These analyses consisted of an overall profile of all injury causes and a list of the leading causes of injury for the major age groups. In some counties, the small number of cases required that age groups be collapsed.

Salient findings of these 24 area-specific analyses:

- Unintentional falls were the leading cause of injury for each area. The proportion of all injuries caused by falls varied substantially by area (25.5% to 64.6%).
- The group most affected by falls were those aged 65 and older. Fall injury rates among this age group were at least 1,000 per 100,000 for most counties. These rates were several times greater than rates for any other cause in the other age groups.
- Assaults caused nearly one-quarter (23.3%) of the injury hospitalizations among Detroit residents. Assaults caused 6% or less of the cases in each of the other areas examined.
- Poisoning was by far the leading mechanism for suicide attempts/intentional self-harm.
- The cause of injury profile was often distinct between counties. This provides support for continuing to perform area-specific analyses.

FIGURE 7
Causes of Injury Hospitalization
Alpena County Residents, 2001
(N = 185 E-coded cases)



E-coding rate for Alpena County: 93%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 3
Specific Causes of Injury Hospitalization
Alpena County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	90	Struck by Object/Person	2	Poisoning	22
MVC – Occupant	13	Other	1	Other	1
Struck by Object/Person	12				
MVC – Motorcyclist	4				
Overexertion	4				
Poisoning	4				
Other	31				
Total	158	Total	3	Total	23

Causes not classifiable above comprised one case.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 4
 Leading Causes of Injury Hospitalization, by Age Group
 Alpena County Residents, 2001
 Cause of Injury Coding Rate: 93% (185 of 198 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	1	100.0	*
5 – 14	1. Unintentional Fall	3	25.0	*
	2. Unintentional Motor Vehicle Crash	2	16.7	*
	2. Unintentional Struck by Object/Person	2	16.7	*
	All Causes	12	100.0	294.3
15 – 24	1. Suicide Attempt/Intentional Self-harm	6	30.0	148.1
	2. Assault	3	15.0	*
	2. Unintentional Motor Vehicle Crash	3	15.0	*
	2. Unintentional Struck by Object/Person	3	15.0	*
	All Causes	20	100.0	493.8
25 – 44	1. Suicide Attempt/Intentional Self-harm	13	27.1	160.4
	2. Unintentional Fall	11	22.9	135.7
	3. Unintentional Motor Vehicle Crash	6	12.5	74.0
	4. Unintentional Bicycle Crash, Non-Motor Vehicle	2	4.2	*
	4. Unintentional Contact with Machinery	2	4.2	*
	4. Unintentional Struck by Object/Person	2	4.2	*
	All Causes	48	100.0	592.2
45 – 64	1. Unintentional Fall	15	46.9	189.2
	2. Unintentional Motor Vehicle Crash	7	21.9	88.3
	3. Unintentional Overexertion	3	9.4	*
	3. Unintentional Struck by Object/Person	3	9.4	*
	All Causes	32	100.0	403.6
65+	1. Unintentional Fall	60	83.3	1,105.8
	2. Unintentional Motor Vehicle Crash	3	4.2	*
	3. Suicide Attempt/Intentional Self-harm	2	2.8	*
	3. Unintentional Poisoning	2	2.8	*
	All Causes	72	100.0	1,326.9

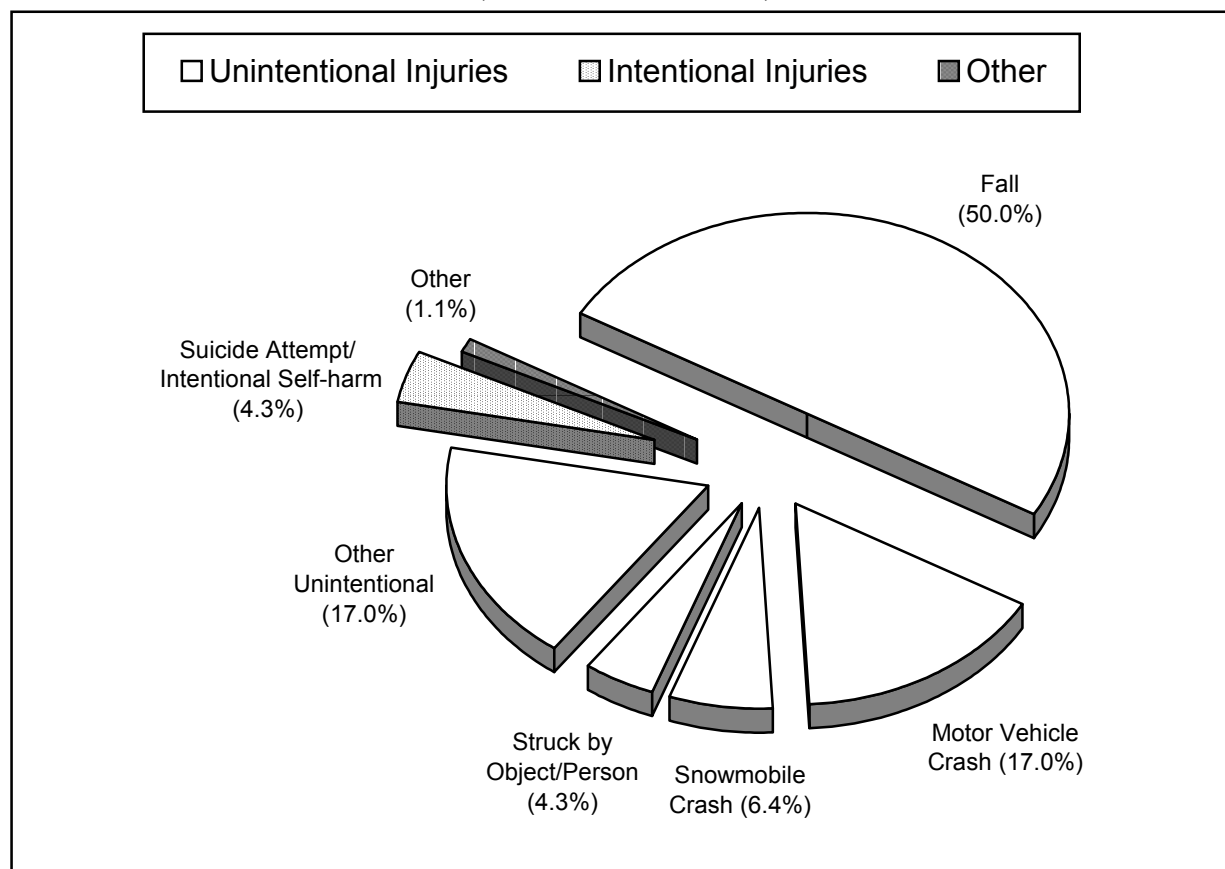
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 8
Causes of Injury Hospitalization
Benzie County Residents, 2001
(N = 94 E-coded cases)



E-coding rate for Benzie County: 99%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 5
Specific Causes of Injury Hospitalization
Benzie County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	47			Poisoning	4
MVC – Occupant	15				
Snowmobile Crash	6				
Struck by Object/Person	4				
Overexertion	2				
Poisoning	2				
Other	13				
Total	89	Total	0	Total	4

Causes not classifiable above comprised one case.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 6
 Leading Causes of Injury Hospitalization, by Age Group
 Benzie County Residents, 2001
 Cause of Injury Coding Rate: 99% (94 of 95 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	1	100.0	*
5 – 14	All Causes	5	100.0	*
15 – 24	1. Unintentional Motor Vehicle Crash	4	30.8	*
	2. Unintentional Fall	3	23.1	*
	3. Unintentional Snowmobile Crash	2	15.4	*
	All Causes	13	100.0	704.6
25 – 44	1. Unintentional Fall	6	31.6	136.8
	2. Unintentional Motor Vehicle Crash	3	15.8	*
	3. Suicide Attempt/Intentional Self-harm	2	10.5	*
	3. Unintentional Snowmobile Crash	2	10.5	*
	All Causes	19	100.0	433.1
45 – 64	1. Unintentional Fall	7	33.3	163.6
	2. Unintentional Motor Vehicle Crash	6	28.6	140.3
	3. Unintentional Struck by Object/Person	2	9.5	*
	All Causes	21	100.0	490.9
65+	1. Unintentional Fall	31	88.6	1,081.3
	2. Unintentional Motor Vehicle Crash	2	5.7	*
	All Causes	35	100.0	1,220.8

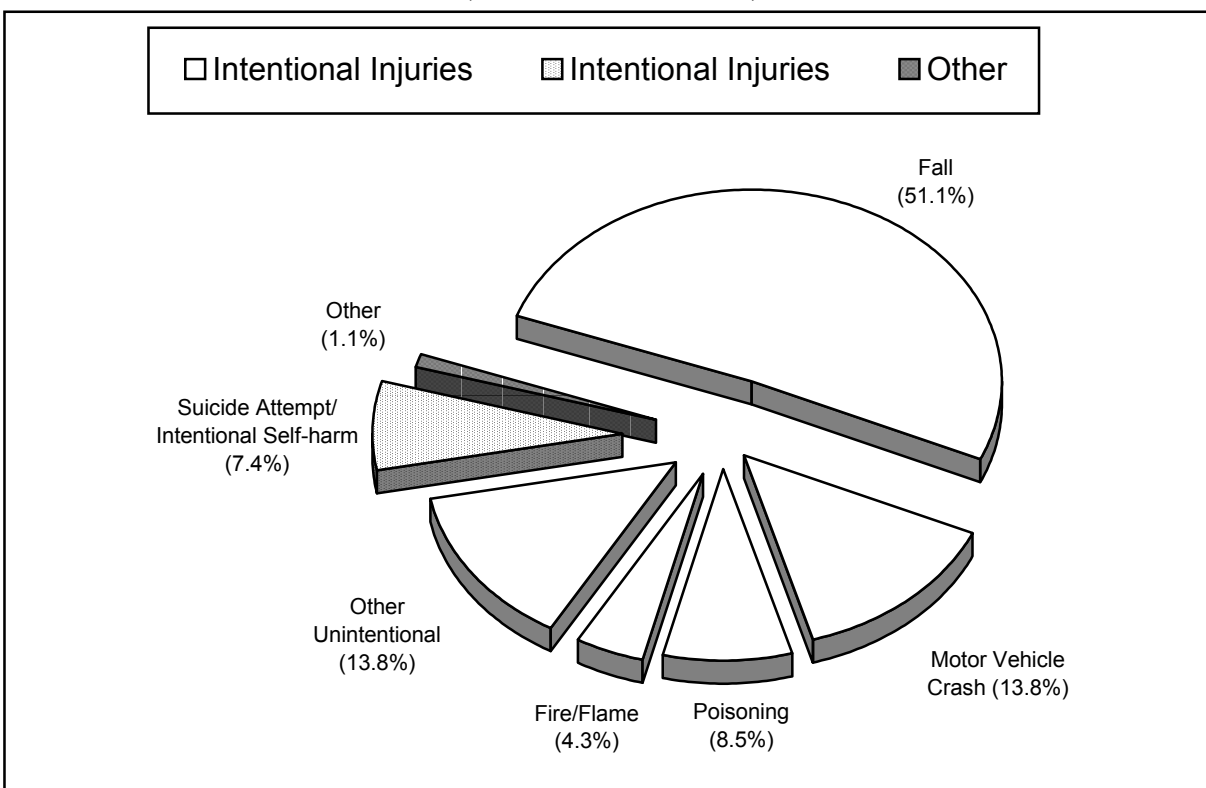
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 9
Causes of Injury Hospitalization
Crawford County Residents, 2001
(N = 94 E-coded cases)



E-coding rate for Crawford County: 96%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 7
Specific Causes of Injury Hospitalization
Crawford County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	48			Poisoning	7
MVC – Occupant	13				
Poisoning	8				
Fire/Flame	4				
Bite/Sting	3				
Bicycle Crash, Non-MVC	2				
Other	8				
Total	86	Total	0	Total	7

Causes not classifiable above comprised one case.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 8
 Leading Causes of Injury Hospitalization, by Age Group
 Crawford County Residents, 2001
 Cause of Injury Coding Rate: 96% (94 of 98 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	All Causes ¹	2	100.0	*
5 – 14	1. Unintentional Bite/Sting	2	40.0	*
	All Causes	5	100.0	*
15 – 24	1. Unintentional Motor Vehicle Crash	3	42.9	*
	All Causes	7	100.0	391.3
25 – 44	1. Unintentional Fall	8	33.3	209.7
	2. Suicide Attempt/Intentional Self-harm	5	20.8	*
	2. Unintentional Motor Vehicle Crash	5	20.8	*
	2. Unintentional Poisoning	5	20.8	*
	All Causes	24	100.0	629.1
45 – 64	1. Unintentional Fall	10	52.6	265.9
	2. Unintentional Motor Vehicle Crash	3	15.8	*
	3. Unintentional Poisoning	2	10.5	*
	All Causes	19	100.0	505.2
65+	1. Unintentional Fall	28	75.7	1,142.9
	2. Unintentional Fire/Flame	2	5.4	*
	2. Unintentional Motor Vehicle Crash	2	5.4	*
	All Causes	37	100.0	1,510.2

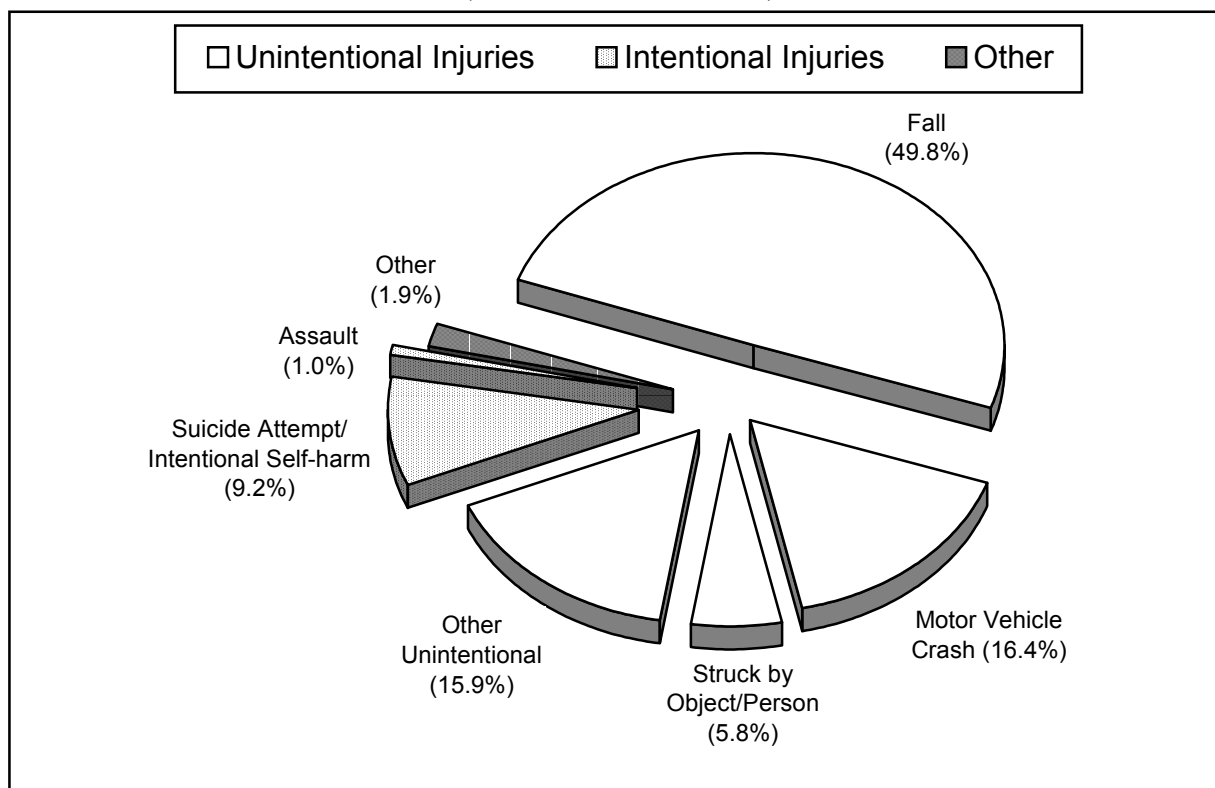
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 10
Causes of Injury Hospitalization
Emmet County Residents, 2001
(N = 207 E-coded cases)



E-coding rate for Emmet County: 91%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 9
Specific Causes of Injury Hospitalization
Emmet County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	103	Sharp Object	1	Poisoning	17
MVC – Occupant	27	Struck by Object/Person	1	Firearm	2
Struck by Object/Person	12				
Poisoning	5				
Bicycle Crash, Non-MVC	4				
Overexertion	4				
Snowmobile Crash	4				
Other	23				
Total	182	Total	2	Total	19

Causes not classifiable above comprised four cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 10
 Leading Causes of Injury Hospitalization, by Age Group
 Emmet County Residents, 2001
 Cause of Injury Coding Rate: 91% (207 of 227 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	All Causes ¹	3	100.0	*
5 – 14	1. Unintentional Bicycle Crash, Non-Motor Vehicle	4	33.3	*
	2. Unintentional Struck by Object/Person	2	16.7	*
	2. Suicide Attempt/Intentional Self-harm	2	16.7	*
	All Causes	12	100.0	266.9
15 – 24	1. Unintentional Struck by Object/Person	6	26.1	149.9
	2. Suicide Attempt/Intentional Self-harm	5	21.7	*
	3. Unintentional Motor Vehicle Crash	4	17.4	*
	4. Unintentional Fall	3	13.0	*
	All Causes	23	100.0	574.4
25 – 44	1. Unintentional Motor Vehicle Crash	11	23.9	123.7
	2. Unintentional Fall	10	21.7	112.5
	3. Suicide Attempt/Intentional Self-harm	8	17.4	90.0
	All Causes	46	100.0	517.4
45 – 64	1. Unintentional Fall	15	46.9	181.3
	2. Unintentional Motor Vehicle Crash	8	25.0	96.7
	3. Suicide Attempt/Intentional Self-harm	4	12.5	*
	All Causes	32	100.0	386.8
65+	1. Unintentional Fall	74	81.3	1,614.3
	2. Unintentional Motor Vehicle Crash	10	11.0	218.2
	3. Unintentional Poisoning	3	3.3	*
	All Causes	91	100.0	1,985.2

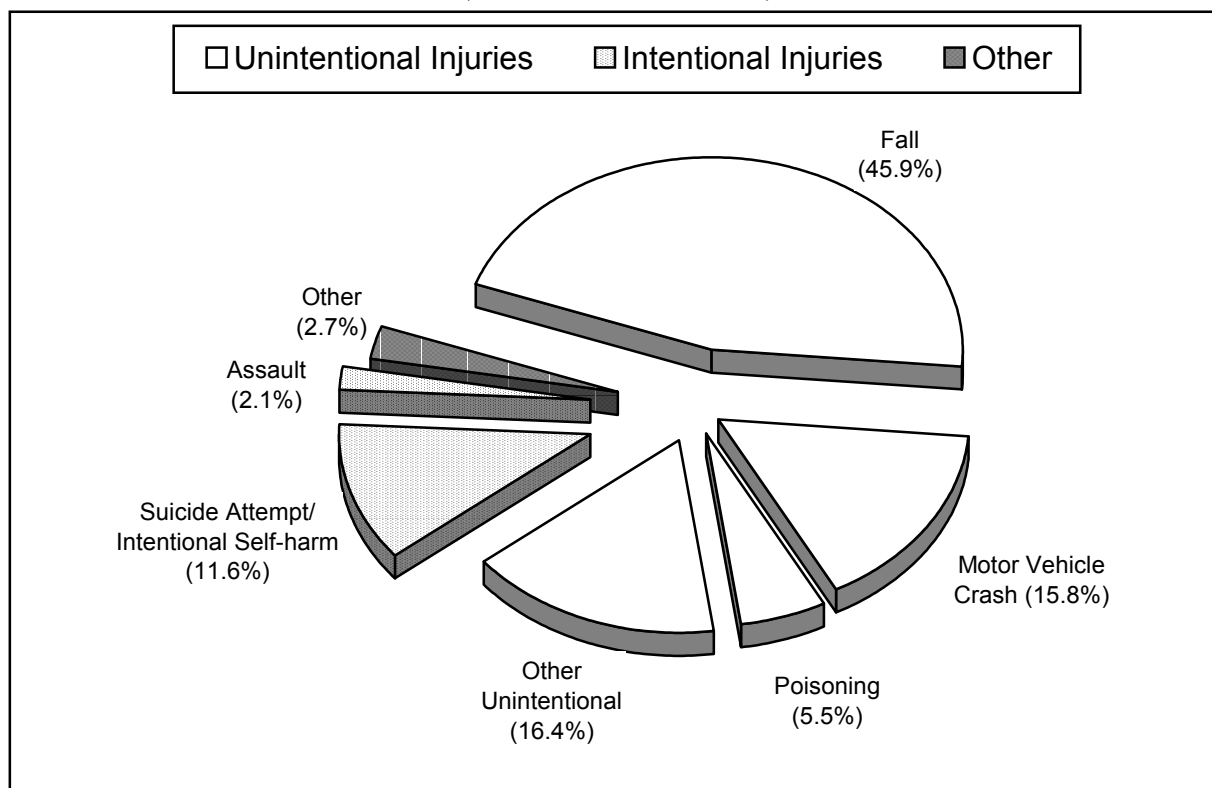
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 11
Causes of Injury Hospitalization
Gladwin County Residents, 2001
(N = 146 E-coded cases)



E-coding rate for Gladwin County: 95%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 11
Specific Causes of Injury Hospitalization
Gladwin County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	67	Struck by Object/Person	2	Poisoning	16
MVC – Occupant	15	Other	1	Other	1
Poisoning	8				
MVC – Motorcyclist	5				
Contact with Machinery	3				
Overexertion	3				
Other	21				
Total	122	Total	3	Total	17

Causes not classifiable above comprised four cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 12
 Leading Causes of Injury Hospitalization, by Age Group
 Gladwin County Residents, 2001
 Cause of Injury Coding Rate: 95% (146 of 153 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	All Causes ¹	4	100.0	*
5 – 14	All Causes	3	100.0	*
15 – 24	1. Unintentional Motor Vehicle Crash	4	36.7	*
	2. Suicide Attempt/Intentional Self-harm	2	18.2	*
	All Causes	11	100.0	357.0
25 – 44	1. Unintentional Motor Vehicle Crash	8	26.7	126.4
	2. Suicide Attempt/Intentional Self-harm	5	16.7	*
	3. Unintentional Fall	3	10.0	*
	All Causes	30	100.0	474.2
45 – 64	1. Suicide Attempt/Intentional Self-harm	9	30.0	123.8
	2. Unintentional Fall	8	26.7	110.0
	3. Unintentional Motor Vehicle Crash	6	20.0	82.5
	All Causes	30	100.0	412.6
65+	1. Unintentional Fall	56	82.4	1,141.9
	2. Unintentional Motor Vehicle Crash	3	4.4	*
	2. Unintentional Poisoning	3	4.4	*
	All Causes	68	100.0	1,386.6

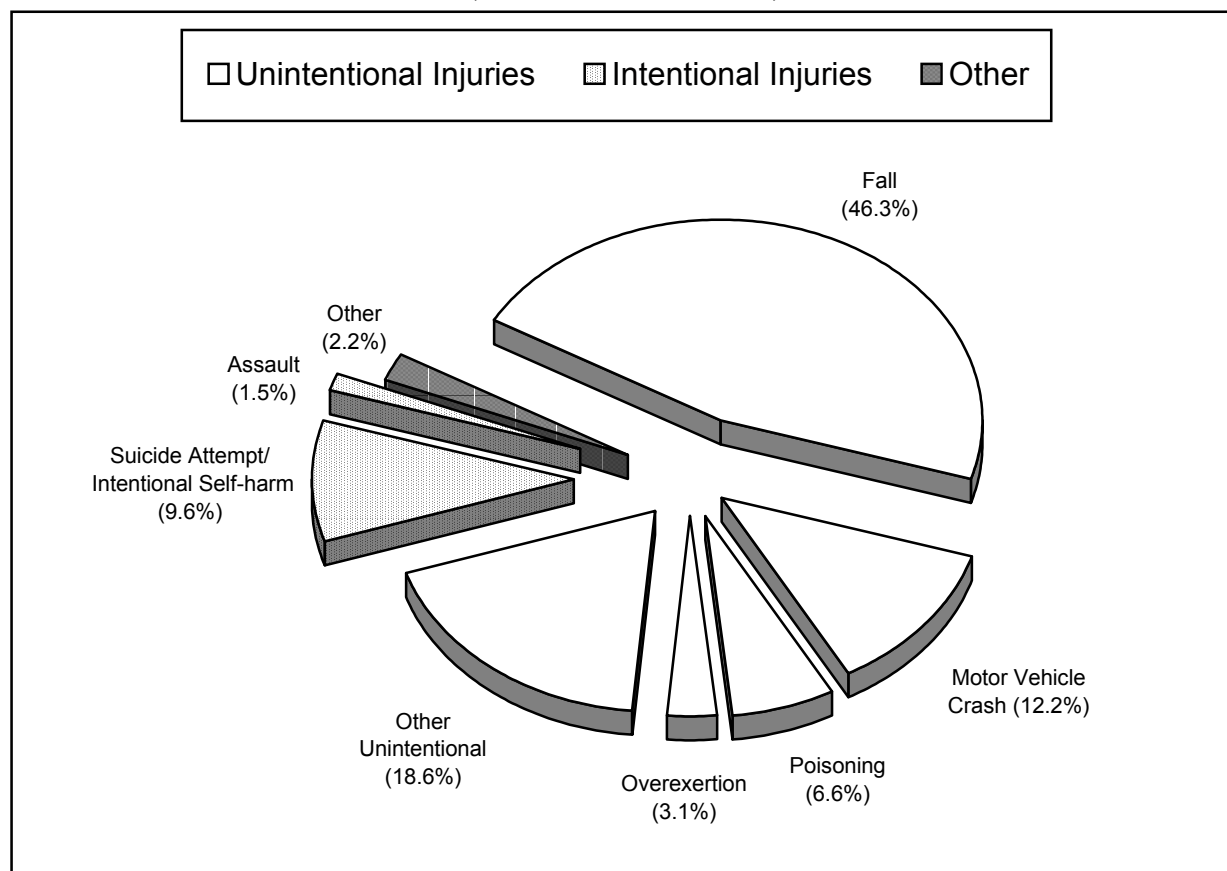
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 12
Causes of Injury Hospitalization
Grand Traverse County Residents, 2001
(N = 458 E-coded cases)



E-coding rate for Grand Traverse County: 98%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 13
Specific Causes of Injury Hospitalization
Grand Traverse County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	212	Firearm	1	Poisoning	41
MVC – Occupant	47	Motor Vehicle	1	Firearm	2
Poisoning	30	Sharp Object	1	Sharp Object	1
Overexertion	14	Struck by Object/Person	1		
Struck by Object/Person	9	Other	3		
Snowmobile Crash	7				
Other	78				
Total	397	Total	7	Total	44

Causes not classifiable above comprised ten cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 14
 Leading Causes of Injury Hospitalization, by Age Group
 Grand Traverse County Residents, 2001
 Cause of Injury Coding Rate: 98% (458 of 469 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	1. Unintentional Fall	3	25.0	*
	1. Unintentional Poisoning	3	25.0	*
	3. Assault	2	16.7	*
	All Causes ¹	12	100.0	254.2
5 – 14	1. Unintentional Fall	10	47.6	89.8
	All Causes	21	100.0	188.5
15 – 24	1. Suicide Attempt/Intentional Self-harm	17	24.3	159.7
	2. Unintentional Motor Vehicle Crash	14	20.0	131.6
	3. Unintentional Fall	13	18.6	122.2
	4. Unintentional Poisoning	7	10.0	65.8
	All Causes	70	100.0	657.8
25 – 44	1. Unintentional Fall	21	23.1	89.9
	2. Suicide Attempt/Intentional Self-harm	15	16.5	64.2
	3. Unintentional Motor Vehicle Crash	14	15.4	59.9
	4. Unintentional Overexertion	5	5.5	*
	4. Unintentional Struck by Object/Person	5	5.5	*
	All Causes	91	100.0	389.4
45 – 64	1. Unintentional Fall	30	38.5	153.1
	2. Suicide Attempt/Intentional Self-harm	12	15.4	61.2
	3. Unintentional Motor Vehicle Crash	11	14.1	56.1
	4. Unintentional Poisoning	5	6.4	*
	All Causes	78	100.0	398.1
65+	1. Unintentional Fall	135	72.6	1,288.5
	2. Unintentional Motor Vehicle Crash	16	8.6	152.7
	3. Unintentional Poisoning	10	5.4	95.4
	4. Unintentional Overexertion	5	2.7	*
	All Causes	186	100.0	1,775.3

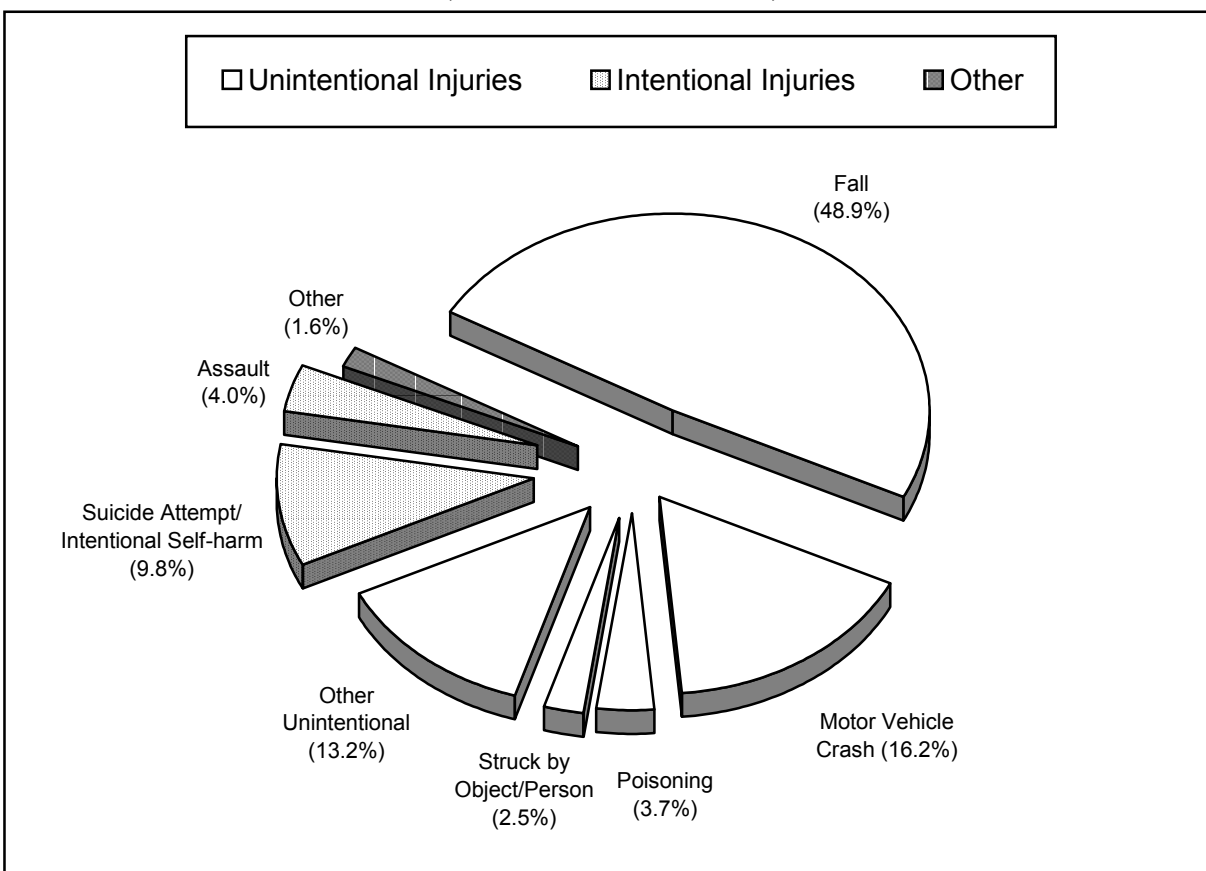
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 13
Causes of Injury Hospitalization
Kalamazoo County Residents, 2001
(N = 1,140 E-coded cases)



E-coding rate for Kalamazoo County: 90%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 15
Specific Causes of Injury Hospitalization
Kalamazoo County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	558	Struck by Object/Person	22	Poisoning	103
MVC – Occupant	140	Sharp Object	6	Sharp Object	7
Poisoning	42	Firearm	5	Other	2
Struck by Object/Person	29	Other	13		
Overexertion	26				
MVC – Motorcyclist	23				
Sharp Object	17				
Bite/Sting	13				
MVC – Pedestrian	13				
Other	103				
Total	964	Total	46	Total	112

Causes not classifiable above comprised 18 cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 16
 Leading Causes of Injury Hospitalization, by Age Group
 Kalamazoo County Residents, 2001
 Cause of Injury Coding Rate: 90% (1,140 of 1,260 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	1. Unintentional Fall	5	18.5	*
	1. Unintentional Motor Vehicle Crash	5	18.5	*
	3. Assault	4	14.8	*
	3. Unintentional Contact with Hot Object	4	14.8	*
	5. Unintentional Suffocation	3	11.1	*
	All Causes ¹	27	100.0	174.7
5 – 14	1. Unintentional Fall	17	30.4	52.3
	2. Unintentional Motor Vehicle Crash	9	16.1	27.7
	3. Unintentional Struck by Object/Person	8	14.3	24.6
	4. Suicide Attempt/Intentional Self-harm	7	12.5	21.5
	5. Unintentional Bicycle Crash, Non-Motor Vehicle	3	5.4	*
	5. Unintentional Poisoning	3	5.4	*
	All Causes	56	100.0	172.4
15 – 24	1. Unintentional Motor Vehicle Crash	50	33.3	110.9
	2. Suicide Attempt/Intentional Self-harm	27	18.0	59.9
	3. Unintentional Fall	18	12.0	39.9
	4. Assault	13	8.7	28.8
	5. Unintentional Struck by Object/Person	8	5.3	17.7
	All Causes	150	100.0	332.8
25 – 44	1. Unintentional Motor Vehicle Crash	67	23.0	100.2
	2. Suicide Attempt/Intentional Self-harm	59	20.3	88.3
	2. Unintentional Fall	59	20.3	88.3
	4. Assault	21	7.2	31.4
	5. Unintentional Poisoning	15	5.2	22.4
	All Causes	291	100.0	435.4
45 – 64	1. Unintentional Fall	91	49.7	174.1
	2. Unintentional Motor Vehicle Crash	34	18.6	65.1
	3. Suicide Attempt/Intentional Self-harm	17	9.3	32.5
	4. Unintentional Overexertion	8	4.4	15.3
	5. Assault	7	3.8	13.4
	All Causes	183	100.0	350.2
65+	1. Unintentional Fall	368	85.0	1,337.8
	2. Unintentional Motor Vehicle Crash	20	4.6	72.7
	3. Unintentional Poisoning	12	2.8	43.6
	4. Unintentional Overexertion	6	1.4	21.8
	5. Unintentional Suffocation	4	0.9	*
	All Causes	433	100.0	1,574.1

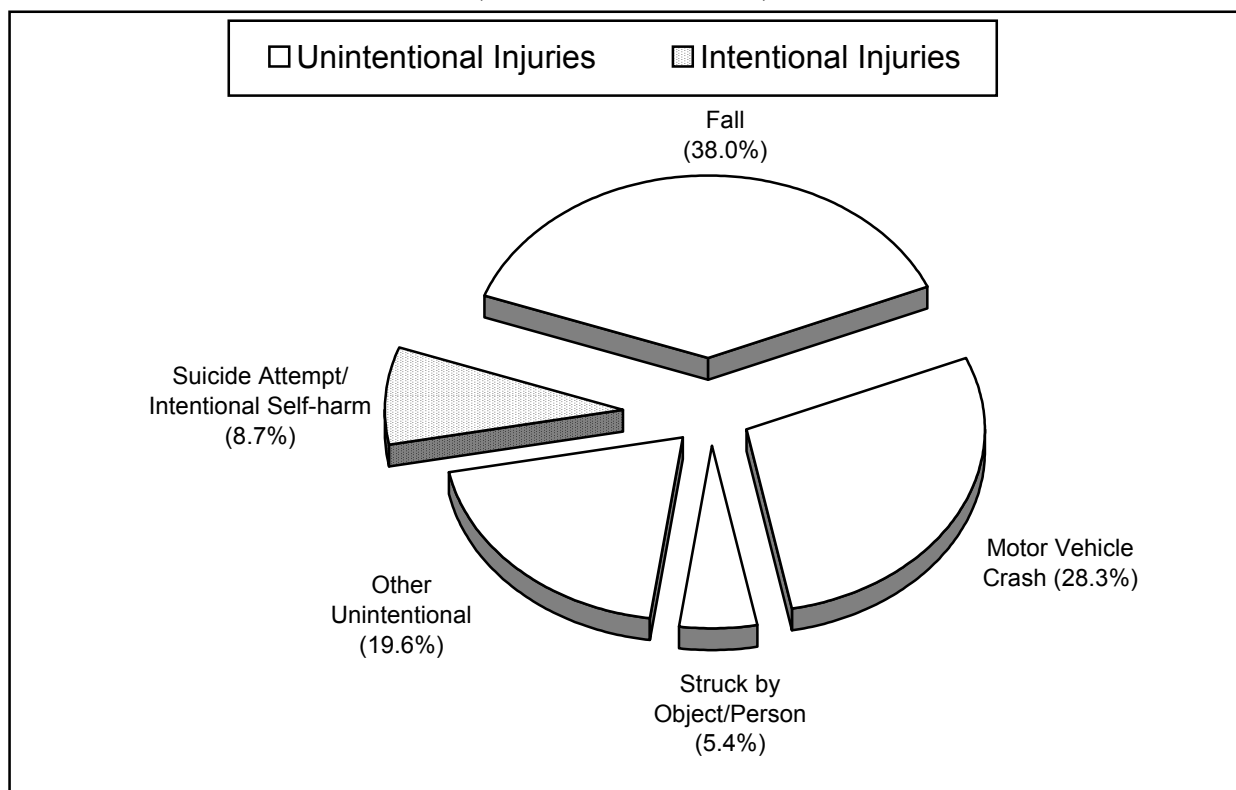
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 14
Causes of Injury Hospitalization
Kalkaska County Residents, 2001
(N = 92 E-coded cases)



E-coding rate for Kalkaska County: 98%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 17
Specific Causes of Injury Hospitalization
Kalkaska County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	35			Poisoning	6
MVC – Occupant	20			Firearm	1
Struck by Object/Person	5			Sharp Object	1
MVC – Motorcyclist	3				
Snowmobile Crash	3				
Other	18				
Total	84	Total	0	Total	8

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 18
 Leading Causes of Injury Hospitalization, by Age Group
 Kalkaska County Residents, 2001
 Cause of Injury Coding Rate: 98% (92 of 94 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	All Causes ¹	5	100.0	*
5 – 14	1. Unintentional Motor Vehicle Crash	3	42.9	*
	2. Unintentional Fall	2	28.6	*
	2. Unintentional Snowmobile Crash	2	28.6	*
	All Causes	7	100.0	290.6
15 – 24	1. Unintentional Motor Vehicle Crash	4	40.0	*
	2. Unintentional Struck by Object/Person	2	20.0	*
	All Causes	10	100.0	473.0
25 – 44	1. Unintentional Motor Vehicle Crash	8	32.0	169.2
	2. Suicide Attempt/Intentional Self-harm	6	24.0	126.9
	3. Unintentional Fall	5	20.0	*
	All Causes	25	100.0	528.7
45 – 64	1. Unintentional Motor Vehicle Crash	7	46.7	166.7
	2. Unintentional Fall	2	13.3	*
	All Causes	15	100.0	357.1
65+	1. Unintentional Fall	25	83.3	1,074.8
	2. Unintentional Motor Vehicle Crash	4	13.3	*
	All Causes	30	100.0	1,289.8

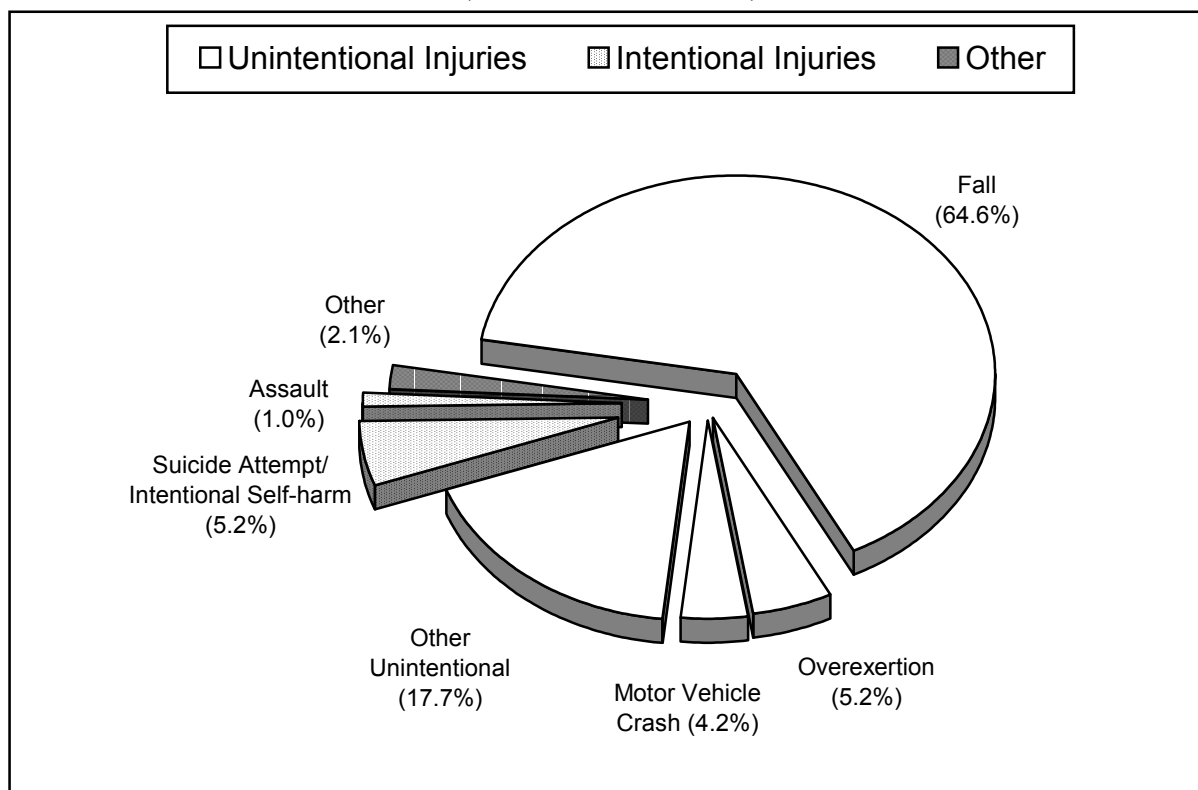
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 15
Causes of Injury Hospitalization
Leelanau County Residents, 2001
(N = 96 E-coded cases)



E-coding rate for Leelanau County: 98%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 19
Specific Causes of Injury Hospitalization
Leelanau County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	62	Unspecified Mechanism	1	Poisoning	5
Overexertion	5				
MVC – Occupant	3				
Poisoning	2				
Struck by Object/Person	2				
Other	14				
Total	88	Total	1	Total	5

Causes not classifiable above comprised two cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 20
 Leading Causes of Injury Hospitalization, by Age Group
 Leelanau County Residents, 2001
 Cause of Injury Coding Rate: 98% (96 of 98 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	All Causes ¹	2	100.0	*
5 – 14	1. Unintentional Fall	3	37.5	*
	All Causes	8	100.0	270.8
15 – 24	All Causes	5	100.0	*
25 – 44	1. Unintentional Fall	4	36.4	*
	1. Suicide Attempt/Intentional Self-Harm	4	36.4	*
	All Causes	11	100.0	218.3
45 – 64	1. Unintentional Fall	16	66.7	258.1
	2. Unintentional Overexertion	2	8.3	*
	All Causes	24	100.0	387.2
65+	1. Unintentional Fall	37	80.4	970.6
	2. Unintentional Overexertion	2	4.3	*
	All Causes	46	100.0	1,206.7

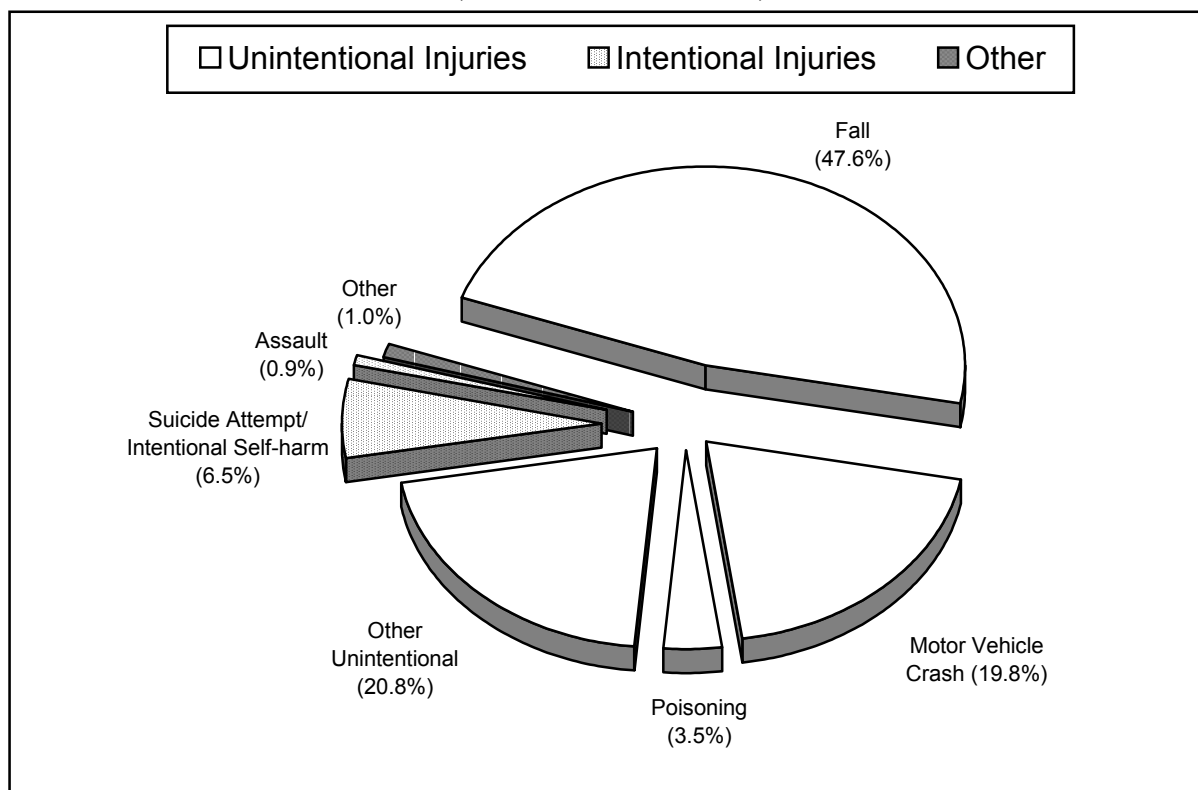
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 16
Causes of Injury Hospitalization
Livingston County Residents, 2001
(N = 572 E-coded cases)



E-coding rate for Livingston County: 90%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 21
Specific Causes of Injury Hospitalization
Livingston County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	272	Struck by Object/Person	3	Poisoning	34
MVC – Occupant	81	Other	2	Other	3
Poisoning	20				
MVC – Motorcyclist	19				
Struck by Object/Person	17				
Bicycle Crash, Non-MVC	11				
Contact with Machinery	9				
Other	95				
Total	524	Total	5	Total	37

Causes not classifiable above comprised six cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 22
 Leading Causes of Injury Hospitalization, by Age Group
 Livingston County Residents, 2001
 Cause of Injury Coding Rate: 90% (572 of 639 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	1. Unintentional Fall	9	47.4	82.6
	2. Unintentional Struck by Object/Person	4	21.1	*
	3. Assault	2	10.5	*
	3. Unintentional Poisoning	2	10.5	*
	All Causes ¹	19	100.0	174.3
5 – 14	1. Unintentional Fall	17	42.5	64.3
	2. Unintentional Motor Vehicle Crash	8	20.0	30.2
	3. Bicycle Crash, Non-Motor Vehicle	5	12.5	*
	4. Unintentional Struck by Object/Person	2	5.0	*
	All Causes	40	100.0	151.2
15 – 24	1. Unintentional Motor Vehicle Crash	18	28.6	87.1
	2. Unintentional Fall	11	17.5	53.2
	3. Suicide Attempt/Intentional Self-harm	10	15.9	48.4
	4. Unintentional Overexertion	4	6.3	*
	4. Unintentional Struck by Object/Person	4	6.3	*
	All Causes	63	100.0	304.8
25 – 44	1. Unintentional Motor Vehicle Crash	30	26.1	59.4
	2. Unintentional Fall	24	20.9	47.6
	3. Suicide Attempt/Intentional Self-harm	18	15.7	35.7
	4. Unintentional Poisoning	9	7.8	17.8
	All Causes	115	100.0	227.9
45 – 64	1. Unintentional Fall	53	39.8	127.5
	2. Unintentional Motor Vehicle Crash	33	24.8	79.4
	3. Suicide Attempt/Intentional Self-harm	8	6.0	19.2
	4. Unintentional Contact with Machinery	5	3.8	*
	4. Unintentional Poisoning	5	3.8	*
	All Causes	133	100.0	319.9
65+	1. Unintentional Fall	158	78.2	1,156.6
	2. Unintentional Motor Vehicle Crash	23	11.4	168.4
	3. Unintentional Contact with Hot Object	2	1.0	*
	3. Unintentional Overexertion	2	1.0	*
	3. Unintentional Poisoning	2	1.0	*
	All Causes	202	100.0	1,478.7

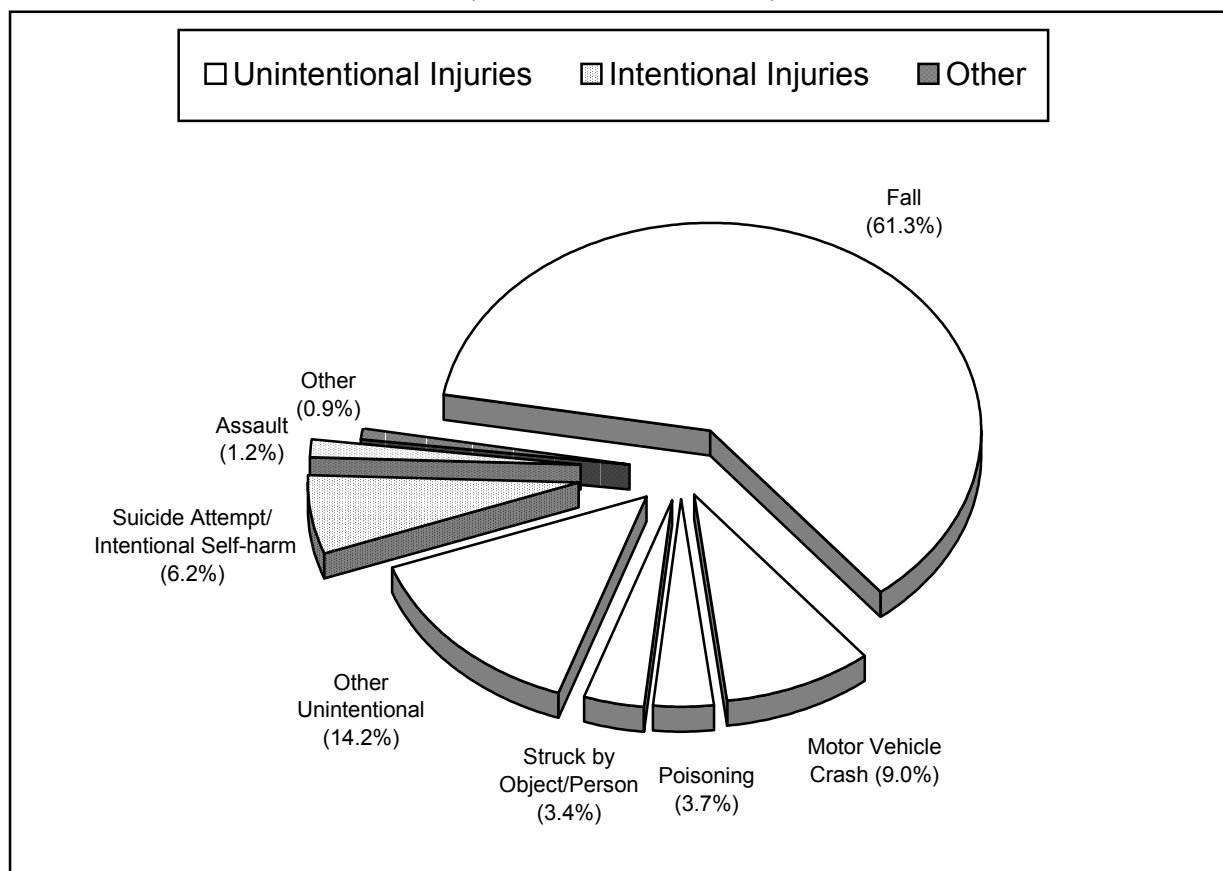
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 17
Causes of Injury Hospitalization
Marquette County Residents, 2001
(N = 323 E-coded cases)



E-coding rate for Marquette County: 94%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 23
Specific Causes of Injury Hospitalization
Marquette County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	198	Struck by Object/Person	1	Poisoning	13
MVC – Occupant	22	Unspecified Mechanism	3	Firearm	3
Poisoning	12			Sharp Object	3
Struck by Object/Person	11			Jump	1
Fire/Flame	8				
Bicycle Crash, Non-MVC	7				
Sharp Object	4				
Other	34				
Total	296	Total	4	Total	20

Causes not classifiable above comprised three cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 24
Leading Causes of Injury Hospitalization, by Age Group
Marquette County Residents, 2001
Cause of Injury Coding Rate: 94% (323 of 345 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	1. Unintentional Fall	3	27.3	*
	2. Assault	2	18.2	*
	2. Unintentional Contact with Hot Object	2	18.2	*
	2. Unintentional Poisoning	2	18.2	*
	All Causes ¹	11	100.0	354.3
5 – 14	1. Unintentional Fall	6	35.3	80.3
	2. Bicycle Crash, Non-Motor Vehicle	4	23.5	*
	3. Unintentional Struck by Object/Person	3	17.6	*
	All Causes	17	100.0	227.5
15 – 24	1. Unintentional Fall	8	25.0	68.7
	2. Unintentional Struck by Object/Person	6	18.7	51.5
	3. Unintentional Motor Vehicle Crash	5	15.6	*
	4. Suicide Attempt/Intentional Self-harm	3	9.4	*
	5. Unintentional Fire/Flame	2	6.3	*
	All Causes	32	100.0	274.7
25 – 44	1. Unintentional Fall	16	32.0	93.7
	2. Suicide Attempt/Intentional Self-harm	14	28.0	82.0
	3. Unintentional Motor Vehicle Crash	5	10.0	*
	4. Unintentional Fire/Flame	3	6.0	*
	5. Bicycle Crash, Non-Motor Vehicle	2	4.0	*
	5. Unintentional Contact With Machinery	2	4.0	*
	All Causes	50	100.0	292.7
45 – 64	1. Unintentional Fall	34	54.8	206.4
	2. Unintentional Motor Vehicle Crash	12	19.4	72.9
	3. Unintentional Poisoning	3	4.8	*
	4. Suicide Attempt/Intentional Self-harm	2	3.2	*
	4. Unintentional Struck by Object/Person	2	3.2	*
	All Causes	62	100.0	376.4
65+	1. Unintentional Fall	131	86.8	1,490.7
	2. Unintentional Motor Vehicle Crash	6	4.0	68.3
	3. Unintentional Poisoning	5	3.3	*
	4. Unintentional Fire/Flame	2	1.3	*
	All Causes	151	100.0	1,718.3

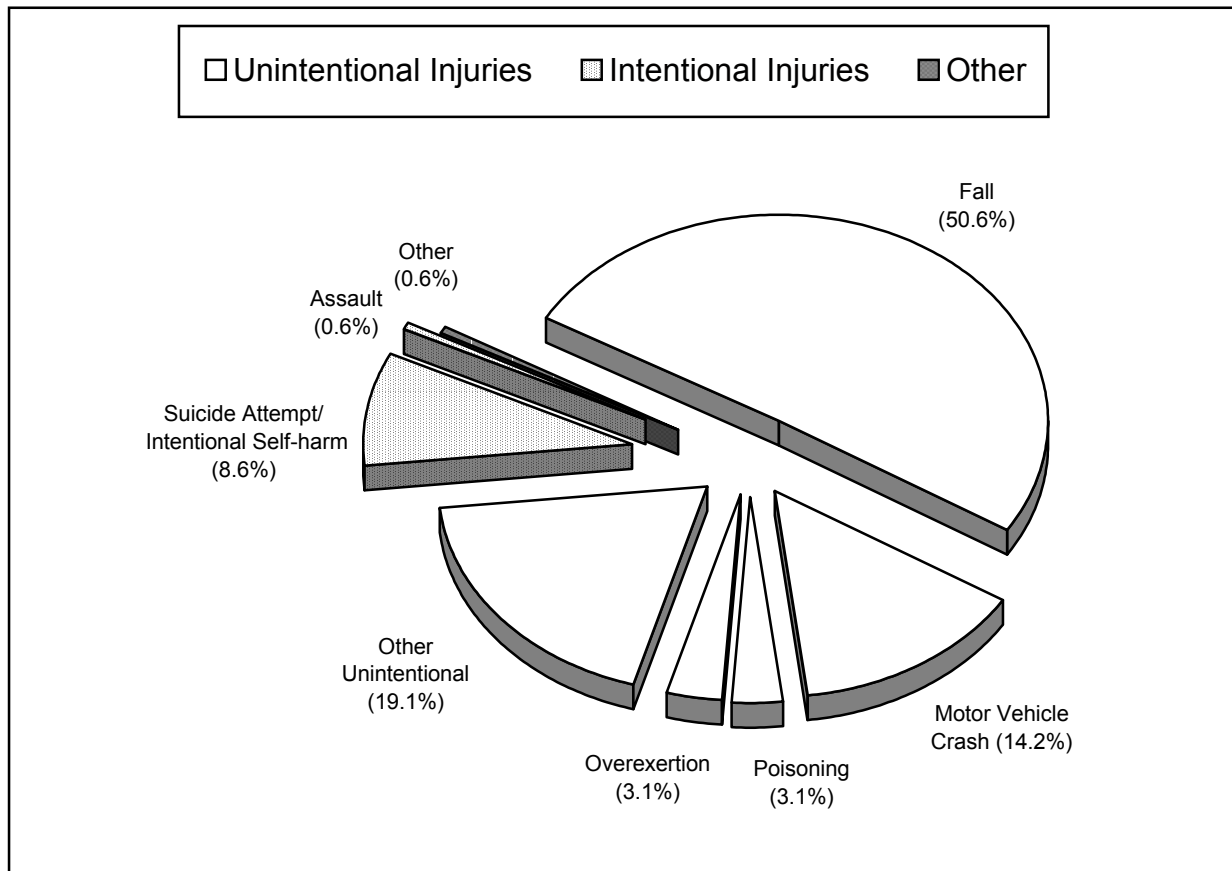
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
U.S. Census Bureau, Population Estimates Branch

FIGURE 18
Causes of Injury Hospitalization
Menominee County Residents, 2001
(N = 162 E-coded cases)



E-coding rate for Menominee County: 94%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 25
Specific Causes of Injury Hospitalization
Menominee County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	82	Struck by Object/Person	1	Poisoning	13
MVC – Occupant	21			Sharp Object	1
Overexertion	5				
Poisoning	5				
Contact with Machinery	4				
Snowmobile Crash	4				
Struck by Object/Person	3				
Other	22				
Total	146	Total	1	Total	14

Causes not classifiable above comprised one case.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 26
 Leading Causes of Injury Hospitalization, by Age Group
 Menominee County Residents, 2001
 Cause of Injury Coding Rate: 94% (162 of 173 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	All Causes ¹	3	100.0	*
5 – 14	All Causes	6	100.0	180.9
15 – 24	1. Unintentional Motor Vehicle Crash	8	42.1	250.9
	2. Suicide Attempt/Intentional Self-harm	3	15.8	*
	3. Unintentional Fall	2	10.5	*
	3. Unintentional Snowmobile Crash	2	10.5	*
	All Causes	19	100.0	596.0
25 – 44	1. Unintentional Motor Vehicle Crash	9	36.0	138.2
	2. Suicide Attempt/Intentional Self-harm	5	20.0	*
	3. Unintentional Fall	4	16.0	*
	All Causes	25	100.0	383.9
45 – 64	1. Unintentional Fall	14	43.8	216.2
	2. Suicide Attempt/Intentional Self-harm	5	15.6	*
	3. Unintentional Motor Vehicle Crash	3	9.4	*
	All Causes	32	100.0	494.3
65+	1. Unintentional Fall	59	76.6	1,355.7
	2. Unintentional Contact with Machinery	3	3.9	*
	2. Unintentional Overexertion	3	3.9	*
	2. Unintentional Poisoning	3	3.9	*
	All Causes	77	100.0	1,769.3

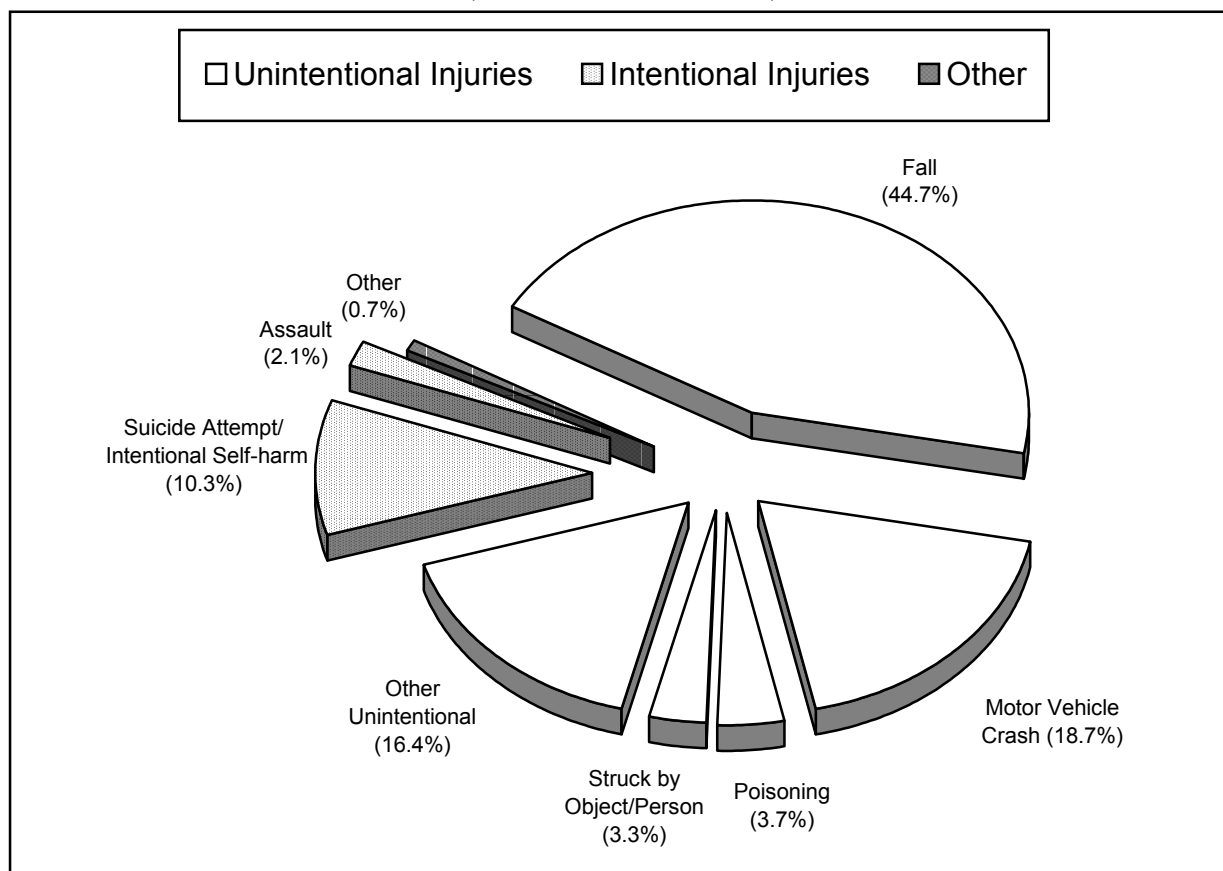
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 19
Causes of Injury Hospitalization
Midland County Residents, 2001
(N = 427 E-coded cases)



E-coding rate for Midland County: 93%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 27
Specific Causes of Injury Hospitalization
Midland County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	191	Struck by Object/Person	3	Poisoning	43
MVC – Occupant	67	Poisoning	2	Sharp Object	1
Poisoning	16	Unspecified Mechanism	4		
Struck by Object/Person	14				
Overexertion	10				
Fire/Flame	8				
MVC – Motorcyclist	5				
Other	60				
Total	371	Total	9	Total	44

Causes not classifiable above comprised three cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 28
Leading Causes of Injury Hospitalization, by Age Group
Midland County Residents, 2001
Cause of Injury Coding Rate: 93% (427 of 459 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	1. Assault	3	27.3	*
	1. Unintentional Fall	3	27.3	*
	1. Unintentional Poisoning	3	27.3	*
	All Causes ¹	11	100.0	209.2
5 – 14	1. Unintentional Motor Vehicle Crash	8	40.0	62.7
	2. Suicide Attempt/Intentional Self-harm	3	15.0	*
	2. Unintentional Fall	3	15.0	*
	All Causes	20	100.0	156.9
15 – 24	1. Unintentional Motor Vehicle Crash	23	37.1	198.0
	2. Suicide Attempt/Intentional Self-harm	14	22.6	120.5
	3. Unintentional Struck by Object/Person	5	8.1	*
	4. Unintentional Fall	4	6.5	*
	5. Unintentional Poisoning	3	4.8	*
	All Causes	62	100.0	533.8
25 – 44	1. Unintentional Motor Vehicle Crash	23	26.4	96.1
	2. Unintentional Fall	17	19.5	71.1
	3. Suicide Attempt/Intentional Self-harm	15	17.2	62.7
	4. Assault	4	4.6	*
	4. Unintentional Poisoning	4	4.6	*
	4. Unintentional Struck by Object/Person	4	4.6	*
	All Causes	87	100.0	363.7
45 – 64	1. Unintentional Fall	33	42.9	164.7
	2. Suicide Attempt/Intentional Self-harm	12	15.6	59.9
	3. Unintentional Motor Vehicle Crash	11	14.3	54.9
	4. Unintentional Fire/Flame	3	3.9	*
	All Causes	77	100.0	384.3
65+	1. Unintentional Fall	131	77.1	1,284.4
	2. Unintentional Motor Vehicle Crash	14	8.2	137.3
	3. Unintentional Overexertion	6	3.5	58.8
	4. Unintentional Poisoning	3	1.8	*
	5. Unintentional Struck by Object/Person	2	1.2	*
	All Causes	170	100.0	1,666.8

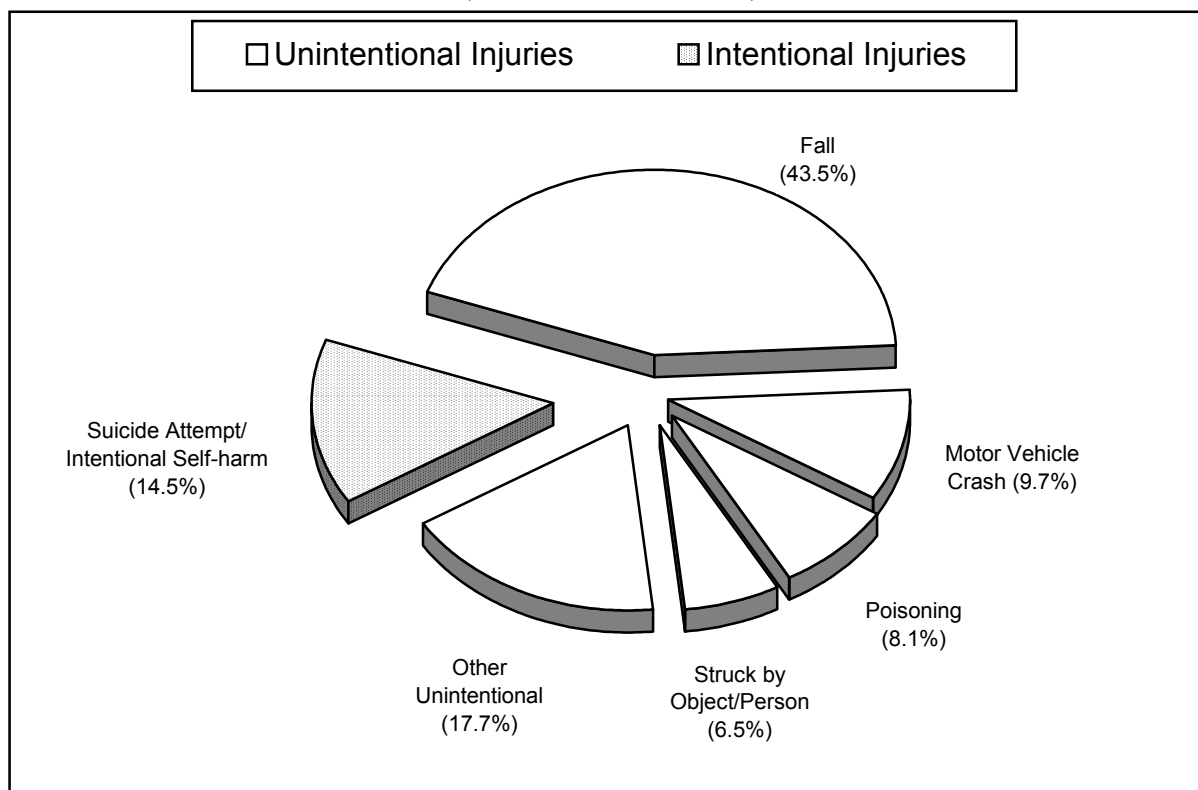
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
U.S. Census Bureau, Population Estimates Branch

FIGURE 20
Causes of Injury Hospitalization
Missaukee County Residents, 2001
(N = 62 E-coded cases)



E-coding rate for Missaukee County: 90%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 29
Specific Causes of Injury Hospitalization
Missaukee County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	27			Poisoning	9
MVC – Occupant	5				
Poisoning	5				
Struck by Object/Person	4				
Other	12				
Total	53	Total	0	Total	9

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 30
 Leading Causes of Injury Hospitalization, by Age Group
 Missaukee County Residents, 2001
 Cause of Injury Coding Rate: 90% (62 of 69 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	All Causes ¹	1	100.0	*
5 – 14	All Causes	2	100.0	*
15 – 24	1. Suicide Attempt/Intentional Self-harm	3	37.5	*
	2. Unintentional Motor Vehicle Crash	2	25.0	*
	2. Unintentional Struck by Object/Person	2	25.0	*
	All Causes	8	100.0	403.2
25 – 44	1. Suicide Attempt/Intentional Self-harm	3	27.3	*
	2. Unintentional Fall	2	18.2	*
	2. Unintentional Poisoning	2	18.2	*
	All Causes	11	100.0	276.2
45 – 64	1. Unintentional Fall	7	41.2	198.8
	2. Suicide Attempt/Intentional Self-harm	3	17.6	*
	3. Unintentional Motor Vehicle Crash	2	11.8	*
	All Causes	17	100.0	482.7
65+	1. Unintentional Fall	18	78.3	836.4
	All Causes	23	100.0	1,068.8

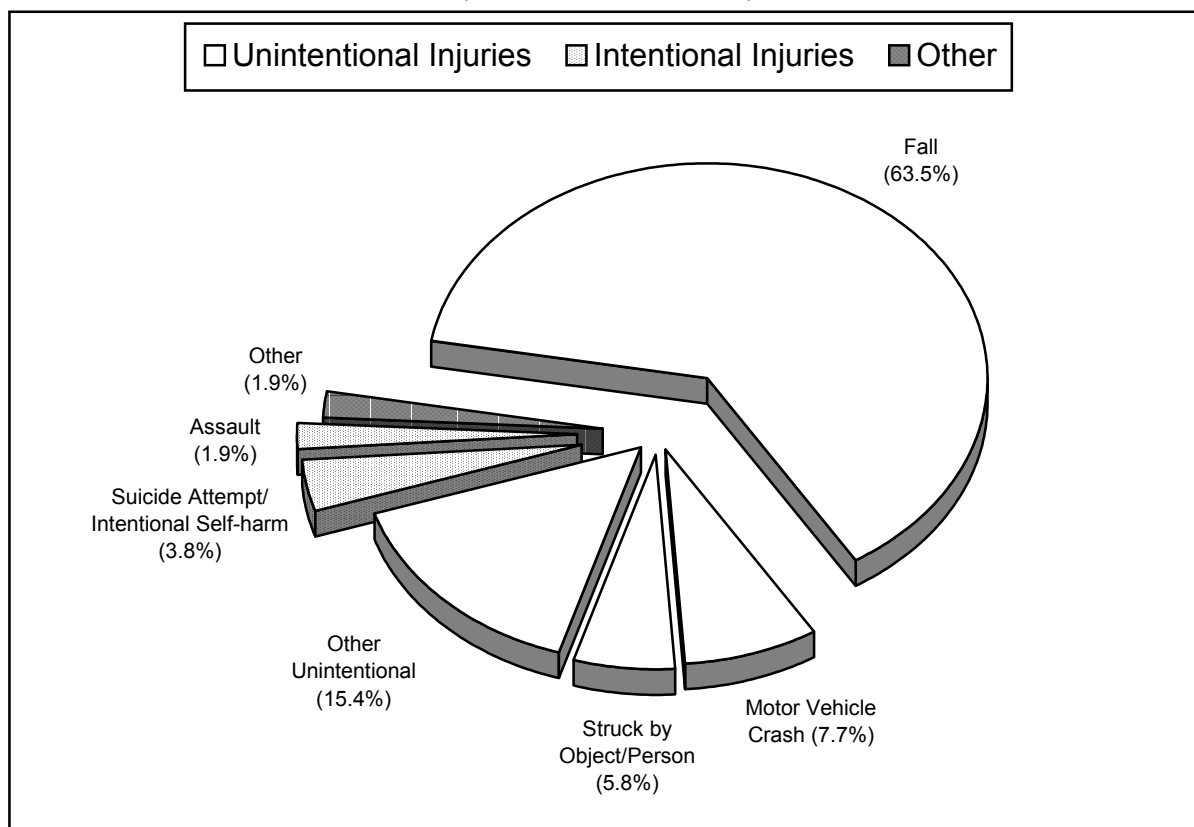
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 21
Causes of Injury Hospitalization
Montmorency County Residents, 2001
(N = 52 E-coded cases)



E-coding rate for Montmorency County: 93%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 31
Specific Causes of Injury Hospitalization
Montmorency County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	33	Struck by Object/Person	1	Poisoning	2
MVC – Occupant	3				
Struck by Object/Person	3				
Contact with Machinery	2				
Snowmobile Crash	2				
Other	5				
Total	48	Total	1	Total	2

Causes not classifiable above comprised one case.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 32
 Leading Causes of Injury Hospitalization, by Age Group
 Montmorency County Residents, 2001
 Cause of Injury Coding Rate: 93% (52 of 56 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	0	-	-
5 – 14	All Causes	1	100.0	*
15 – 44 ²	1. Unintentional Motor Vehicle Crash	2	20.0	*
	1. Unintentional Struck by Object/Person	2	20.0	*
	All Causes	10	100.0	298.3
45 – 64	1. Unintentional Fall	6	54.6	196.1
	All Causes	11	100.0	359.6
65+	1. Unintentional Fall	26	86.7	1,045.4
	All Causes	30	100.0	1,206.3

1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

2. Age groups 15-24 and 25-44 were combined due to the small number of cases in each group.

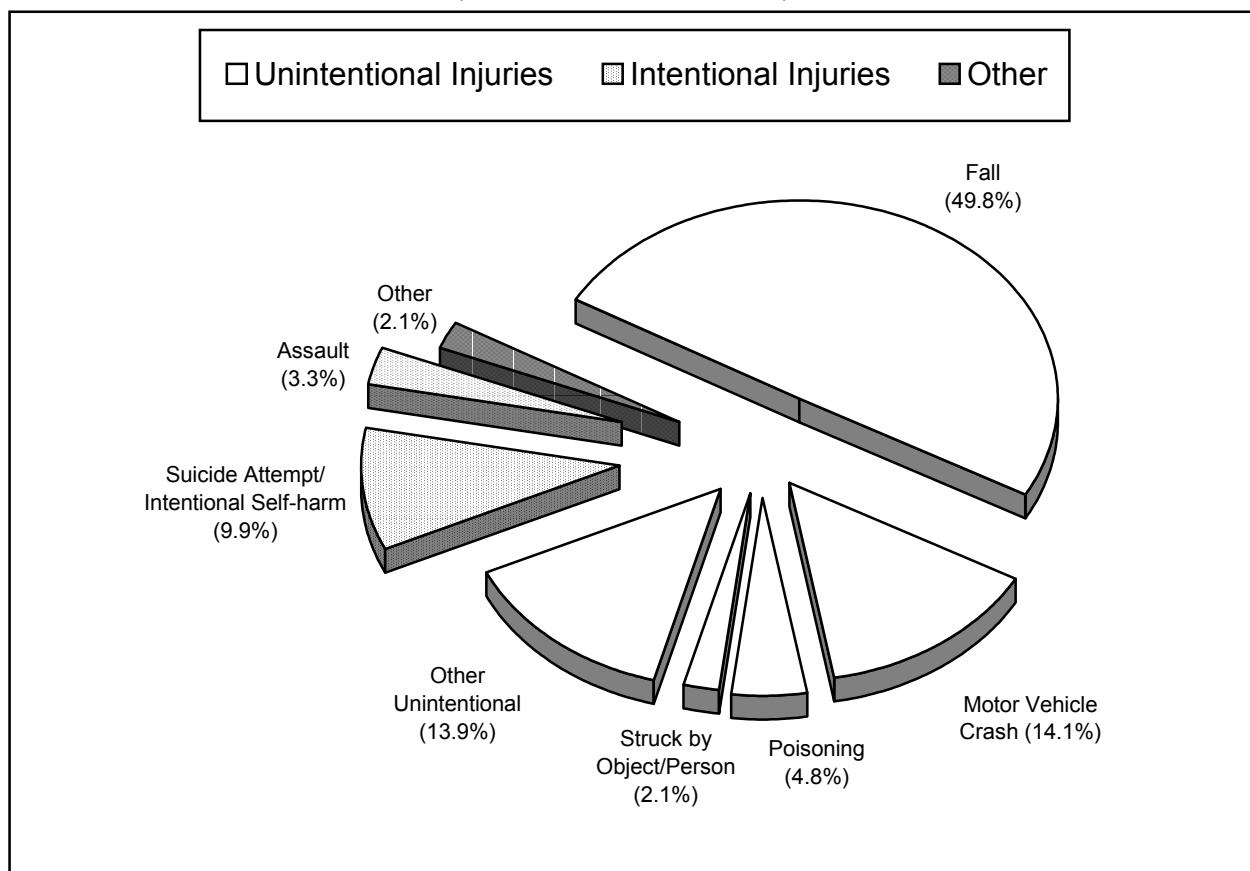
* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

U.S. Census Bureau, Population Estimates Branch

FIGURE 22
Causes of Injury Hospitalization
Oakland County Residents, 2001
(N = 5,221 E-coded cases)



E-coding rate for Oakland County: 91%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 33
Specific Causes of Injury Hospitalization
Oakland County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	2,602	Struck by Object/Person	80	Poisoning	481
MVC – Occupant	534	Firearm	38	Sharp Object	21
Poisoning	252	Sharp Object	29	Firearm	7
Struck by Object/Person	112	Other	24	Fire/Flames	3
MVC – Motorcyclist	92			Suffocation/Hanging	2
MVC – Pedestrian	67			Other	3
Overexertion	66				
Bicycle Crash, Non-MVC	64				
Sharp Object	49				
Fire/Flames	44				
Other	542				
Total	4,424	Total	171	Total	517

Causes not classifiable above comprised 109 cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 34
 Leading Causes of Injury Hospitalization, by Age Group
 Oakland County Residents, 2001
 Cause of Injury Coding Rate: 91% (5,221 of 5,754 discharges)

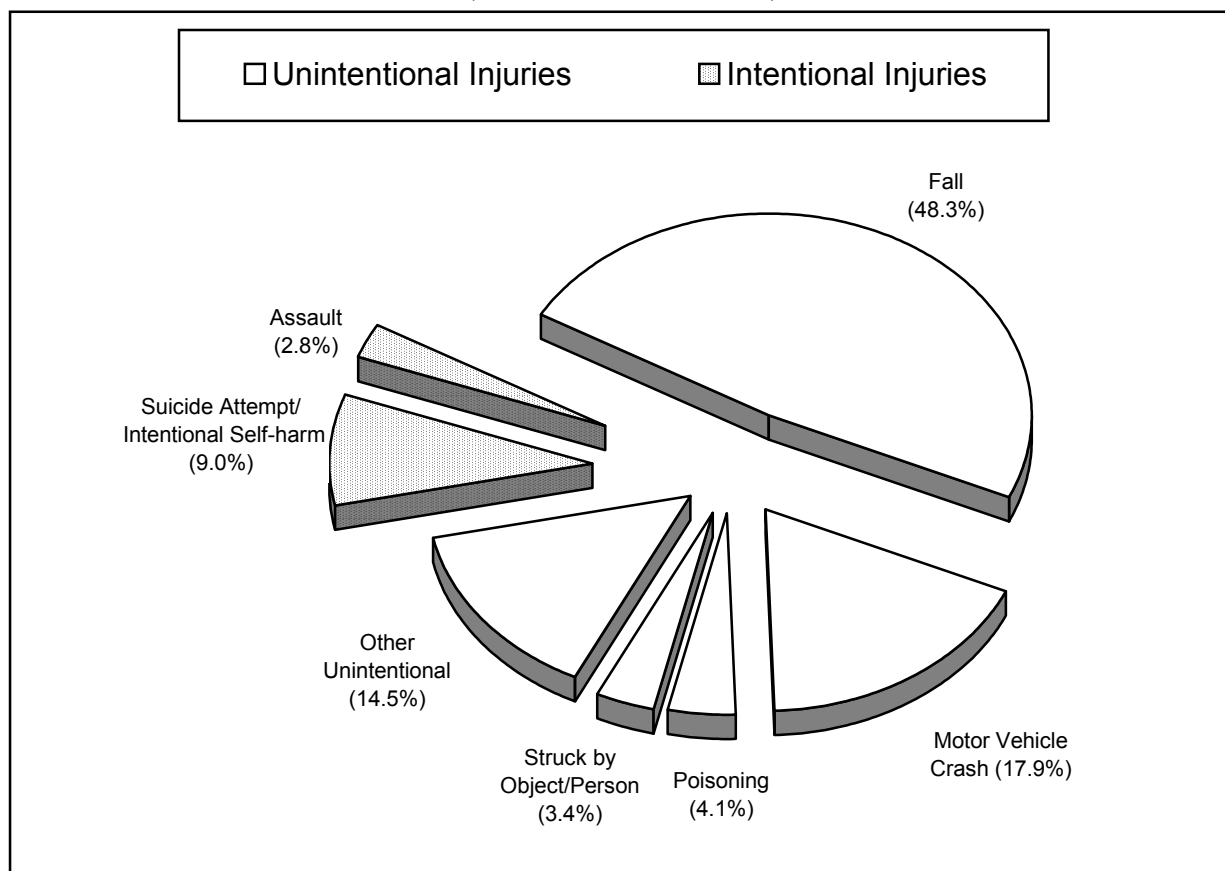
Age Group	Cause of Injury	No.	%	Rate
< 5	1. Unintentional Fall	57	34.5	72.1
	2. Unintentional Poisoning	29	17.6	36.7
	3. Unintentional Contact with Hot Object	18	10.9	22.8
	4. Unintentional Motor Vehicle Crash	10	6.1	12.7
	5. Unintentional Struck by Object/Person	9	5.5	11.4
	All Causes ¹	165	100.0	208.8
5 – 14	1. Unintentional Fall	96	37.2	56.2
	2. Unintentional Motor Vehicle Crash	46	17.8	26.9
	3. Unintentional Struck by Object/Person	22	8.5	12.9
	4. Unintentional Bicycle Crash, Non-Motor Vehicle	19	7.4	11.1
	5. Suicide Attempt/Intentional Self-harm	17	6.6	9.9
	All Causes	258	100.0	150.9
15 – 24	1. Unintentional Motor Vehicle Crash	156	28.9	114.3
	2. Suicide Attempt/Intentional Self-harm	134	24.9	98.2
	3. Unintentional Fall	54	10.0	39.6
	4. Assault	46	8.5	33.7
	5. Unintentional Poisoning	24	4.5	17.6
	All Causes	539	100.0	395.0
25 – 44	1. Unintentional Motor Vehicle Crash	220	20.4	57.8
	2. Suicide Attempt/Intentional Self-harm	214	19.8	56.3
	3. Unintentional Fall	207	19.2	54.4
	4. Assault	81	7.5	21.3
	5. Unintentional Poisoning	77	7.1	20.2
	All Causes	1,080	100.0	283.9
45 – 64	1. Unintentional Fall	379	38.8	126.8
	2. Unintentional Motor Vehicle Crash	159	16.3	53.2
	3. Suicide Attempt/Intentional Self-harm	120	12.3	40.2
	4. Unintentional Poisoning	61	6.2	20.4
	5. Assault	31	3.2	10.4
	All Causes	977	100.0	327.0
65+	1. Unintentional Fall	1,809	82.2	1,329.8
	2. Unintentional Motor Vehicle Crash	143	6.5	105.1
	3. Unintentional Poisoning	53	2.4	39.0
	4. Suicide Attempt/Intentional Self-harm	32	1.5	23.5
	5. Unintentional Overexertion	27	1.2	19.8
	All Causes	2,202	100.0	1,618.7

1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 23
Causes of Injury Hospitalization
Roscommon County Residents, 2001
(N = 145 E-coded cases)



E-coding rate for Roscommon County: 97%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 35
Specific Causes of Injury Hospitalization
Roscommon County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	70	Struck by Object/Person	2	Poisoning	13
MVC – Occupant	25	Sharp Object	1		
Poisoning	6	Other	1		
Struck by Object/Person	5				
Overexertion	4				
Contact with Hot Object	2				
Other	16				
Total	128	Total	4	Total	13

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 36
 Leading Causes of Injury Hospitalization, by Age Group
 Roscommon County Residents, 2001
 Cause of Injury Coding Rate: 97% (145 of 150 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	1. Unintentional Contact with Hot Object	2	28.6	*
	1. Unintentional Fall	2	28.6	*
	All Causes ¹	7	100.0	663.5
5 – 14	1. Unintentional Fall	3	60.0	*
	All Causes	5	100.0	*
15 – 24	1. Unintentional Motor Vehicle Crash	5	62.5	*
	All Causes	8	100.0	304.0
25 – 44	1. Unintentional Motor Vehicle Crash	8	27.6	148.0
	2. Unintentional Fall	4	13.8	*
	2. Unintentional Struck by Object/Person	4	13.8	*
	4. Suicide Attempt/Intentional Self-harm	3	10.3	*
	All Causes	29	100.0	536.4
45 – 64	1. Unintentional Fall	14	37.8	186.1
	2. Suicide Attempt/Intentional Self-harm	8	21.6	106.3
	2. Unintentional Motor Vehicle Crash	8	21.6	106.3
	4. Unintentional Poisoning	2	5.4	*
	All Causes	37	100.0	491.8
65+	1. Unintentional Fall	46	78.0	747.8
	2. Unintentional Motor Vehicle Crash	4	6.8	*
	3. Unintentional Overexertion	2	3.4	*
	3. Unintentional Poisoning	2	3.4	*
	All Causes	59	100.0	959.2

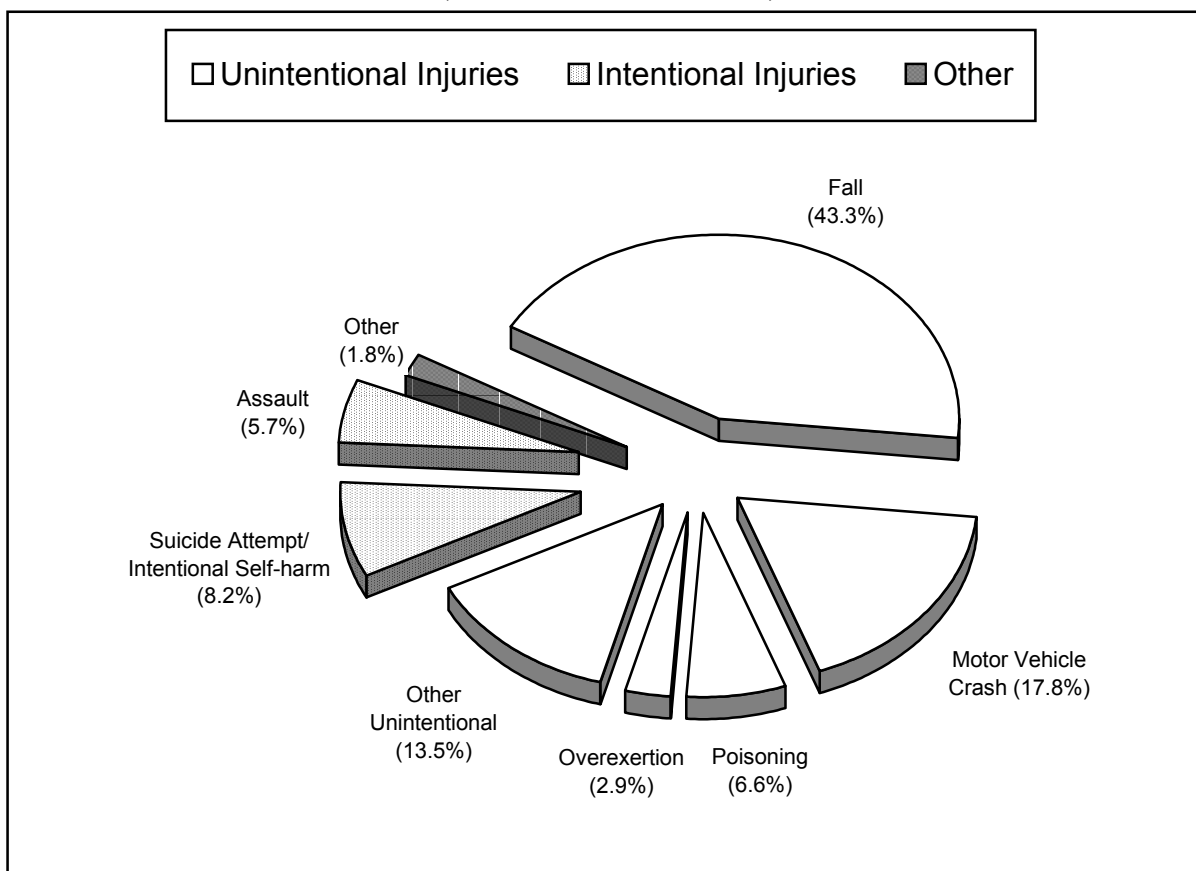
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 24
Causes of Injury Hospitalization
Saginaw County Residents, 2001
(N = 1,359 E-coded cases)



E-coding rate for Saginaw County: 95%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 37
Specific Causes of Injury Hospitalization
Saginaw County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	589	Struck by Object/Person	30	Poisoning	106
MVC – Occupant	191	Firearm	28	Sharp Object	2
Poisoning	90	Sharp Object	11	Firearm	2
Overexertion	40	Other	8	Other	2
Struck by Object/Person	28				
MVC – Pedestrian	21				
MVC – Motorcyclist	17				
Bicycle Crash, Non-MVC	17				
Other	152				
Total	1,145	Total	77	Total	112

Causes not classifiable above comprised 25 cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 38
 Leading Causes of Injury Hospitalization, by Age Group
 Saginaw County Residents, 2001
 Cause of Injury Coding Rate: 95% (1,359 of 1,436 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	1. Unintentional Poisoning	12	27.9	86.4
	2. Unintentional Fall	11	25.6	79.2
	3. Unintentional Motor Vehicle Crash	5	11.6	*
	4. Unintentional Contact with Hot Object	3	7.0	*
	5. Unintentional Fire/Flame	2	4.7	*
	5. Unintentional Suffocation	2	4.7	*
	All Causes ¹	43	100.0	309.5
5 – 14	1. Unintentional Fall	30	39.5	94.7
	2. Unintentional Motor Vehicle Crash	12	15.8	37.9
	3. Unintentional Struck by Object/Person	9	11.8	28.4
	4. Unintentional Bicycle Crash, Non-Motor Vehicle	5	6.6	*
	5. Unintentional Fire/Flame	3	3.9	*
	5. Assault	3	3.9	*
	All Causes	76	100.0	239.9
15 – 24	1. Unintentional Motor Vehicle Crash	56	34.6	192.8
	2. Suicide Attempt/Intentional Self-harm	26	16.0	89.5
	3. Assault	24	14.8	82.6
	4. Unintentional Fall	21	13.0	72.3
	5. Unintentional Struck by Object/Person	7	4.3	24.1
	All Causes	162	100.0	557.9
25 – 44	1. Unintentional Motor Vehicle Crash	76	22.6	134.3
	2. Unintentional Fall	64	19.0	113.1
	3. Suicide Attempt/Intentional Self-harm	60	17.9	106.1
	4. Assault	36	10.7	63.6
	5. Unintentional Poisoning	30	8.9	53.0
	All Causes	336	100.0	594.0
45 – 64	1. Unintentional Fall	90	34.4	179.2
	2. Unintentional Motor Vehicle Crash	51	19.5	101.5
	3. Unintentional Poisoning	24	9.2	47.8
	4. Suicide Attempt/Intentional Self-harm	20	7.6	39.8
	5. Unintentional Overexertion	16	6.1	31.8
	All Causes	262	100.0	521.5
65+	1. Unintentional Fall	373	77.7	1,306.2
	2. Unintentional Motor Vehicle Crash	42	8.8	147.1
	3. Unintentional Poisoning	18	3.8	63.0
	4. Unintentional Overexertion	10	2.1	35.0
	5. Suicide Attempt/Intentional Self-harm	4	0.8	*
	All Causes	480	100.0	1,680.8

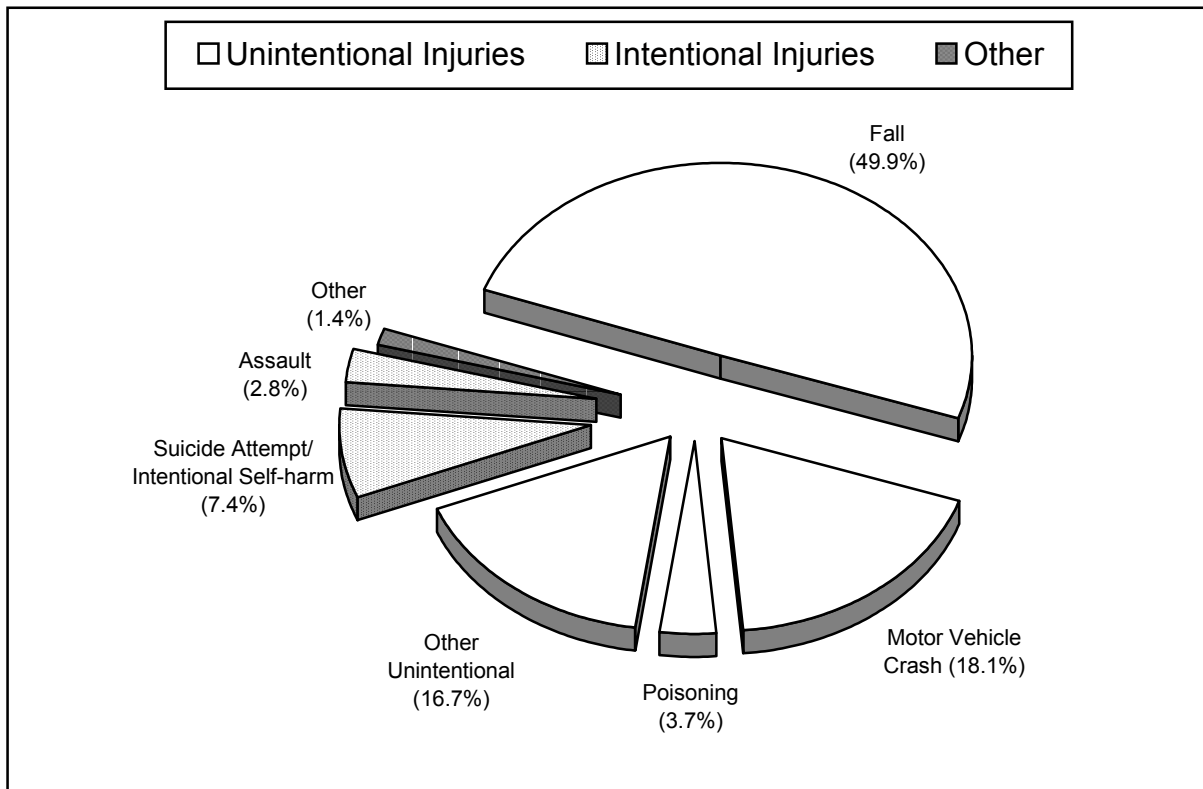
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 25
Causes of Injury Hospitalization
St. Joseph County Residents, 2001
(N = 353 E-coded cases)



E-coding rate for St. Joseph County: 91%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 39
Specific Causes of Injury Hospitalization
St. Joseph County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	176	Struck by Object/Person	5	Poisoning	24
MVC – Occupant	51	Firearm	2	Firearm	1
Poisoning	13	Sharp Object	2	Sharp Object	1
MVC – Motorcyclist	10	Other	1		
Overexertion	10				
Contact with Hot Object	4				
Contact with Machinery	4				
Sharp Object	4				
Struck by Object/Person	4				
Other	36				
Total	312	Total	10	Total	26

Causes not classifiable above comprised five cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 40
 Leading Causes of Injury Hospitalization, by Age Group
 St. Joseph County Residents, 2001
 Cause of Injury Coding Rate: 91% (353 of 386 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	1. Unintentional Fall	6	60.0	133.4
	All Causes ¹	10	100.0	222.4
5 – 14	1. Unintentional Fall	6	33.3	63.3
	2. Unintentional Motor Vehicle Crash	3	16.7	*
	All Causes	18	100.0	189.9
15 – 24	1. Unintentional Motor Vehicle Crash	16	30.2	183.5
	2. Suicide Attempt/Intentional Self-harm	8	15.1	91.8
	3. Assault	6	11.3	68.8
	4. Unintentional Fall	4	7.5	*
	5. Unintentional Overexertion	3	5.7	*
	All Causes	53	100.0	608.0
25 – 44	1. Unintentional Fall	22	31.0	127.8
	2. Unintentional Motor Vehicle Crash	16	22.5	93.0
	3. Suicide Attempt/Intentional Self-harm	12	16.9	69.7
	4. Unintentional Overexertion	5	7.0	*
	5. Assault	3	4.2	*
	All Causes	71	100.0	412.5
45 – 64	1. Unintentional Fall	30	44.1	206.3
	2. Unintentional Motor Vehicle Crash	19	27.9	130.6
	3. Suicide Attempt/Intentional Self-harm	5	7.4	*
	4. Unintentional Poisoning	4	5.9	*
	5. Sharp Object	2	2.9	*
	All Causes	68	100.0	467.6
65+	1. Unintentional Fall	108	81.2	1,339.1
	2. Unintentional Motor Vehicle Crash	9	6.8	111.6
	3. Unintentional Poisoning	5	3.8	*
	All Causes	133	100.0	1,649.1

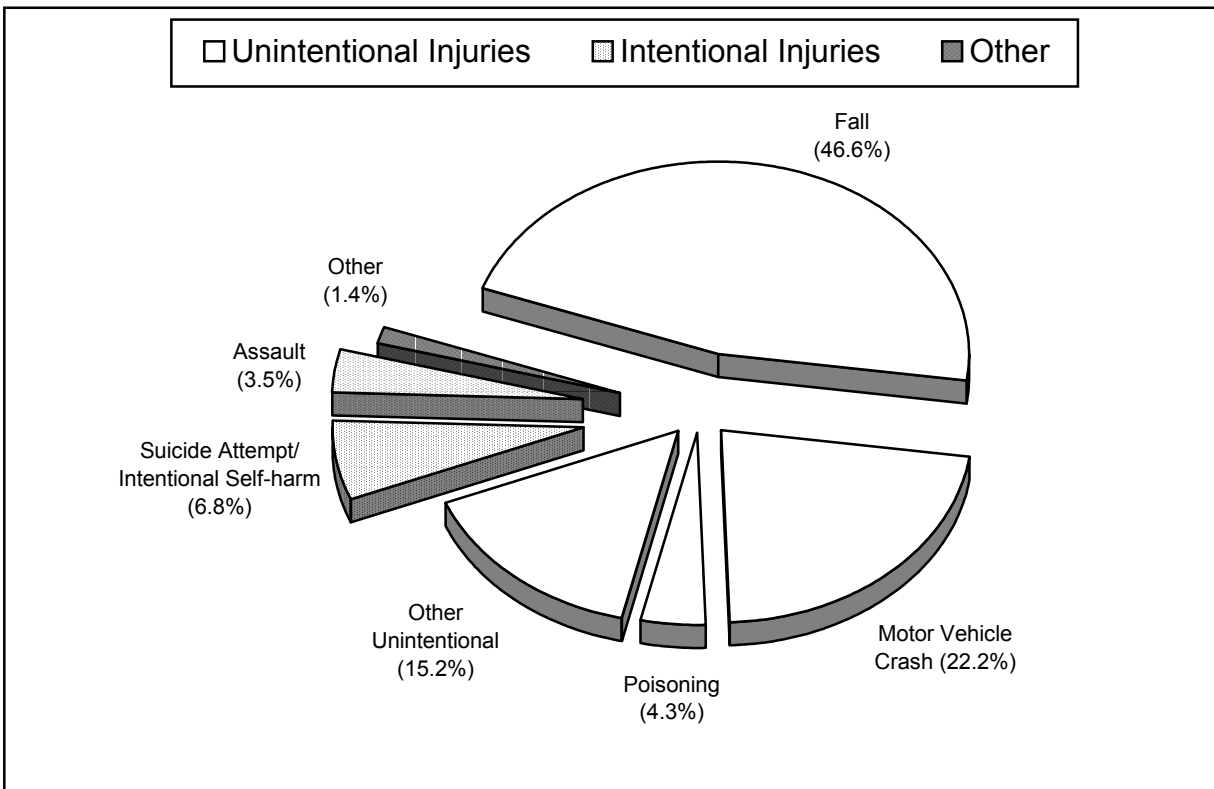
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 26
Causes of Injury Hospitalization
Van Buren County Residents, 2001
(N = 369 E-coded cases)



E-coding rate for Van Buren County: 92%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 41
Specific Causes of Injury Hospitalization
Van Buren County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	172	Struck by Object/Person	4	Poisoning	24
MVC – Occupant	64	Firearm	3	Sharp Object	1
Poisoning	16	Sharp Object	3		
Struck by Object/Person	9	Other	3		
Contact with Machinery	8				
MVC – Pedestrian	8				
Fire/Flames	6				
MVC – Motorcyclist	5				
Other	38				
Total	326	Total	13	Total	25

Causes not classifiable above comprised five cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 42
 Leading Causes of Injury Hospitalization, by Age Group
 Van Buren County Residents, 2001
 Cause of Injury Coding Rate: 92% (369 of 403 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	1. Unintentional Motor Vehicle Crash	3	33.3	*
	2. Unintentional Suffocation	2	22.2	*
	All Causes ¹	9	100.0	175.0
5 – 14	1. Unintentional Fall	3	37.5	*
	All Causes	8	100.0	66.0
15 – 24	1. Unintentional Motor Vehicle Crash	30	58.8	289.9
	2. Suicide Attempt/Intentional Self-harm	6	11.8	58.0
	3. Unintentional Contact with Machinery	3	5.9	*
	3. Unintentional Poisoning	3	5.9	*
	5. Unintentional Fall	2	3.9	*
	5. Unintentional Fire/Flames	2	3.9	*
	All Causes	51	100.0	492.8
25 – 44	1. Unintentional Motor Vehicle Crash	22	26.5	104.5
	2. Suicide Attempt/Intentional Self-harm	12	14.5	57.0
	2. Unintentional Fall	12	14.5	57.0
	4. Assault	6	7.2	28.5
	4. Unintentional Struck by Object/Person	6	7.2	28.5
	All Causes	83	100.0	394.3
45 – 64	1. Unintentional Fall	38	48.7	203.6
	2. Unintentional Motor Vehicle Crash	17	21.8	91.1
	3. Suicide Attempt/Intentional Self-harm	6	7.7	32.1
	4. Assault	5	6.4	*
	5. Unintentional Overexertion	2	2.6	*
	5. Unintentional Poisoning	2	2.6	*
	All Causes	78	100.0	417.9
65+	1. Unintentional Fall	117	83.6	1,244.9
	2. Unintentional Motor Vehicle Crash	9	6.4	95.8
	3. Unintentional Poisoning	6	4.3	63.8
	4. Unintentional Sharp Object	2	1.4	*
	All Causes	140	100.0	1,489.7

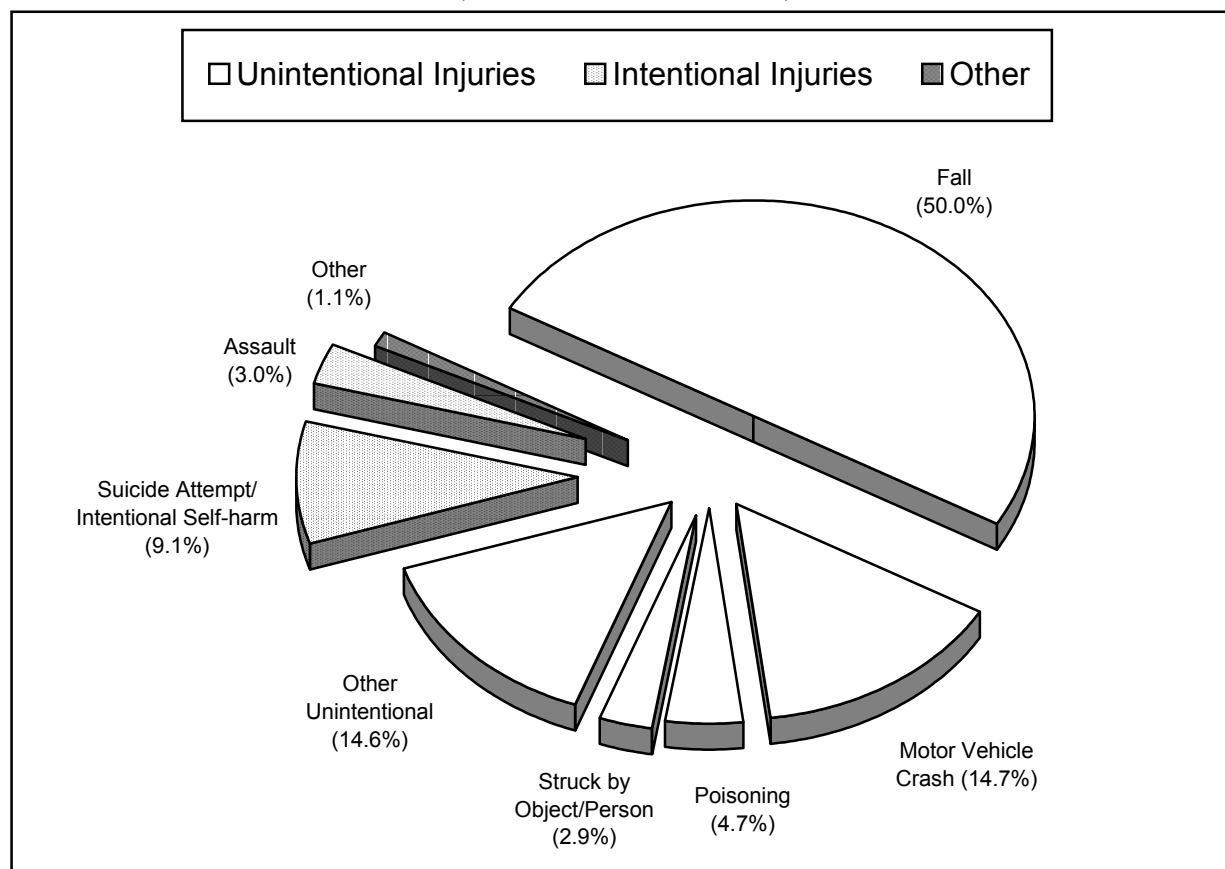
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 27
Causes of Injury Hospitalization
Washtenaw County Residents, 2001
(N = 1,215 E-coded cases)



E-coding rate for Washtenaw County: 91%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 43
Specific Causes of Injury Hospitalization
Washtenaw County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	607	Struck by Object/Person	11	Poisoning	101
MVC – Occupant	130	Sharp Object	10	Sharp Object	6
Poisoning	57	Firearm	6	Firearm	2
Struck by Object/Person	35	Other	10	Other	2
Bicycle Crash, Non-MVC	23				
Overexertion	20				
MVC – Motorcyclist	18				
Hot Object	15				
MVC – Pedestrian	14				
Other	135				
Total	1,054	Total	37	Total	111

Causes not classifiable above comprised 13 cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 44
Leading Causes of Injury Hospitalization, by Age Group
Washtenaw County Residents, 2001
Cause of Injury Coding Rate: 91% (1,215 of 1,336 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	1. Unintentional Poisoning	9	31.0	44.0
	2. Unintentional Fall	8	27.6	39.1
	3. Unintentional Contact with Hot Object	4	13.8	*
	3. Unintentional Motor Vehicle Crash	4	13.8	*
	All Causes ¹	29	100.0	141.8
5 – 14	1. Unintentional Fall	23	33.3	56.8
	2. Suicide Attempt/Intentional Self-harm	7	10.1	17.3
	2. Unintentional Bicycle Crash, Non-Motor Vehicle	7	10.1	17.3
	2. Unintentional Struck by Object/Person	7	10.1	17.3
	5. Unintentional Contact with Hot Object	4	5.8	*
	All Causes	69	100.0	170.3
15 – 24	1. Unintentional Motor Vehicle Crash	46	31.1	69.8
	2. Suicide Attempt/Intentional Self-harm	31	20.9	47.0
	3. Unintentional Fall	18	12.2	27.3
	4. Unintentional Struck by Object/Person	11	7.4	16.7
	5. Assault	9	6.1	13.7
	All Causes	148	100.0	224.6
25 – 44	1. Unintentional Fall	79	28.9	75.0
	2. Unintentional Motor Vehicle Crash	55	20.1	52.2
	3. Suicide Attempt/Intentional Self-harm	43	15.8	40.8
	4. Assault	19	7.0	18.0
	5. Unintentional Poisoning	12	4.4	11.4
	All Causes	273	100.0	259.3
45 – 64	1. Unintentional Fall	106	42.7	151.2
	2. Unintentional Motor Vehicle Crash	40	16.1	57.1
	3. Suicide Attempt/Intentional Self-harm	30	12.1	42.8
	4. Unintentional Poisoning	21	8.5	30.0
	5. Assault	6	2.4	8.6
	5. Unintentional Bicycle Crash, Non-Motor Vehicle	6	2.4	8.6
	All Causes	248	100.0	353.8
65+	1. Unintentional Fall	373	83.3	1,378.5
	2. Unintentional Motor Vehicle Crash	30	6.7	110.9
	3. Unintentional Struck by Object/Person	8	1.8	29.6
	4. Unintentional Overexertion	7	1.6	25.9
	4. Unintentional Poisoning	7	1.6	25.9
	All Causes	448	100.0	1,655.7

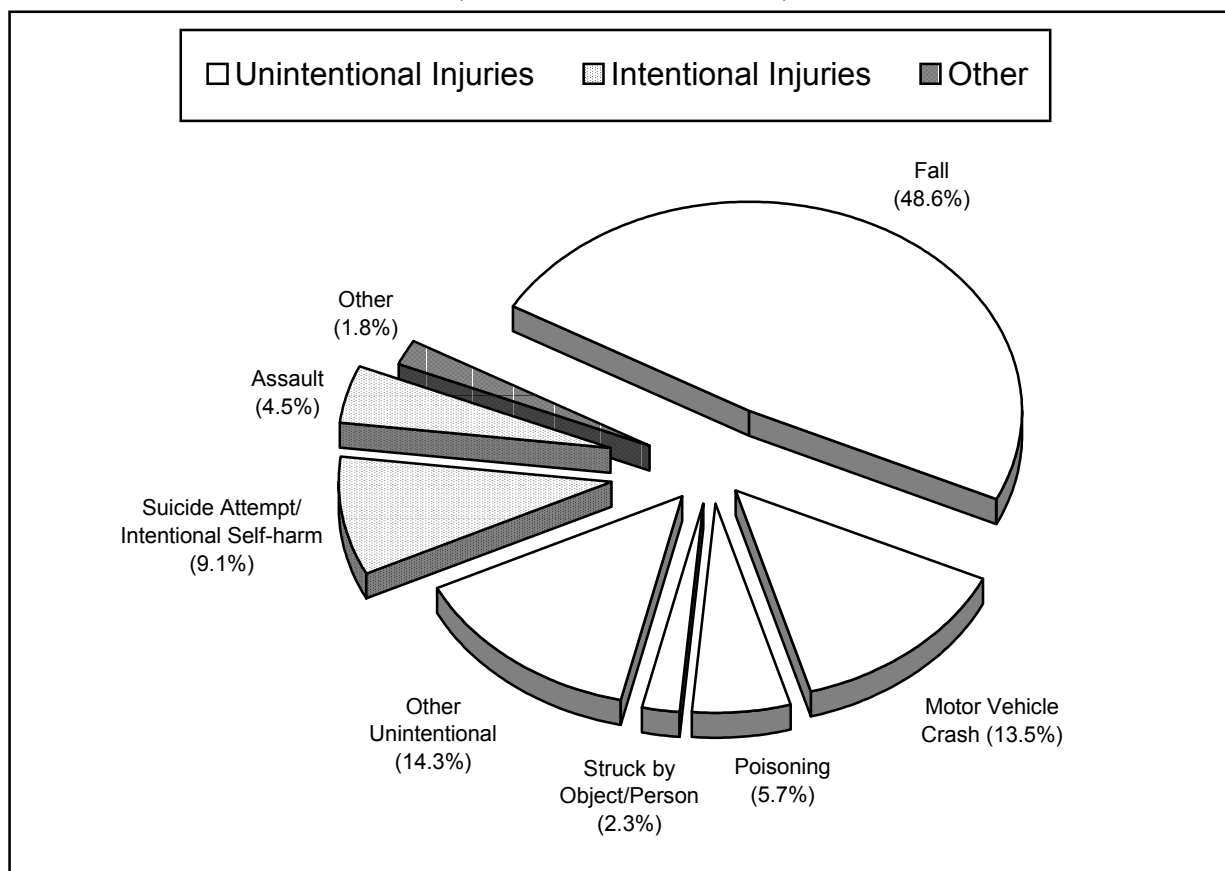
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
U.S. Census Bureau, Population Estimates Branch

FIGURE 28
Causes of Injury Hospitalization
Wayne Out-county Residents, 2001
(N = 5,585 E-coded cases)



E-coding rate for Wayne Out-county: 91%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 45
Specific Causes of Injury Hospitalization
Wayne Out-county Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	2,717	Struck by Object/Person	98	Poisoning	479
MVC – Occupant	524	Firearm	53	Firearm	13
Poisoning	321	Sharp Object	48	Sharp Object	12
Struck by Object/Person	126	Other	56	Other	7
MVC – Motorcyclist	88				
Overexertion	79				
MVC – Pedestrian	77				
Contact with Hot Object	70				
Bicycle Crash, Non-MVC	69				
Machinery	54				
Other	592				
Total	4,717	Total	255	Total	511

Causes not classifiable above comprised 102 cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 46
Leading Causes of Injury Hospitalization, by Age Group
Wayne Out-county Residents, 2001
Cause of Injury Coding Rate: 91% (5,585 of 6,130 discharges)

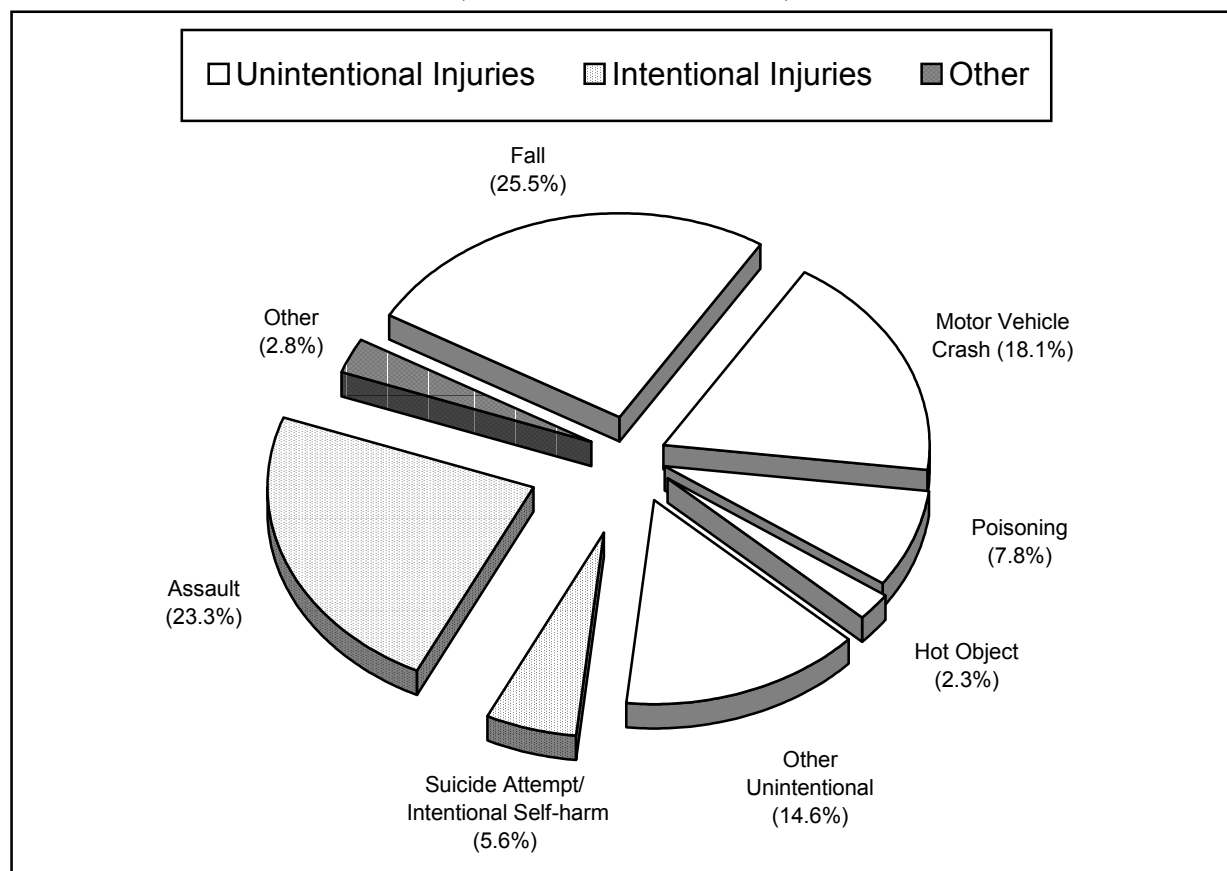
Age Group	Cause of Injury	No.	%	Rate
< 5	1. Unintentional Fall	42	28.8	48.4
	2. Unintentional Poisoning	22	15.1	25.4
	3. Unintentional Contact with Hot Object	19	13.0	21.9
	4. Assault	9	6.2	10.4
	5. Unintentional Suffocation	8	5.5	9.2
	All Causes ¹	146	100.0	168.4
5 – 14	1. Unintentional Fall	99	36.4	57.6
	2. Unintentional Motor Vehicle Crash	49	18.0	28.5
	3. Unintentional Bicycle Crash, Non-Motor Vehicle	27	9.9	15.7
	4. Unintentional Struck by Object/Person	25	9.2	14.6
	5. Suicide Attempt/Intentional Self-harm	16	5.9	9.3
	All Causes	272	100.0	158.4
15 – 24	1. Unintentional Motor Vehicle Crash	151	27.2	112.8
	2. Suicide Attempt/Intentional Self-harm	119	21.4	88.9
	3. Assault	68	12.3	50.8
	4. Unintentional Fall	61	11.0	45.6
	5. Unintentional Struck by Object/Person	29	5.2	21.7
	All Causes	555	100.0	414.5
25 – 44	1. Suicide Attempt/Intentional Self-harm	249	19.4	72.2
	2. Unintentional Motor Vehicle Crash	240	18.7	69.6
	3. Unintentional Fall	239	18.6	69.3
	4. Unintentional Poisoning	121	9.4	35.1
	5. Assault	119	9.3	34.5
	All Causes	1,286	100.0	373.1
45 – 64	1. Unintentional Fall	374	37.5	144.2
	2. Unintentional Motor Vehicle Crash	179	17.9	69.0
	3. Suicide Attempt/Intentional Self-harm	101	10.1	38.9
	4. Unintentional Poisoning	85	8.5	32.8
	5. Assault	45	4.5	17.3
	All Causes	998	100.0	384.7
65+	1. Unintentional Fall	1,902	81.7	1,284.8
	2. Unintentional Motor Vehicle Crash	130	5.6	87.8
	3. Unintentional Poisoning	61	2.6	41.2
	4. Unintentional Overexertion	27	1.2	18.2
	5. Suicide Attempt/Intentional Self-harm	26	1.1	17.6
	All Causes	2,328	100.0	1,572.6

1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
U.S. Census Bureau, Population Estimates Branch

FIGURE 29
Causes of Injury Hospitalization
Detroit City Residents, 2001
(N = 6,487 E-coded cases)



E-coding rate for Detroit City: 93%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 47
Specific Causes of Injury Hospitalization
Detroit City Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	1,652	Firearm	535	Poisoning	327
MVC – Occupant	754	Struck by Object/Person	511	Sharp Object	12
Poisoning	508	Sharp Object	248	Firearm	11
MVC – Pedestrian	257	Motor Vehicle	17	Fall/Jump	7
Hot Object	151	Hot Object	13	Other	9
Struck by Object/Person	143	Fire/Flames	9		
Fire/Flames	129	Other	177		
Sharp Object	99				
MVC – Motorcyclist	68				
Firearm	63				
Other	606				
Total	4,430	Total	1,510	Total	366

Causes not classifiable above comprised 181 cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 48
Leading Causes of Injury Hospitalization, by Age Group
Detroit City Residents, 2001
Cause of Injury Coding Rate: 93% (6,487 of 6,947 discharges)

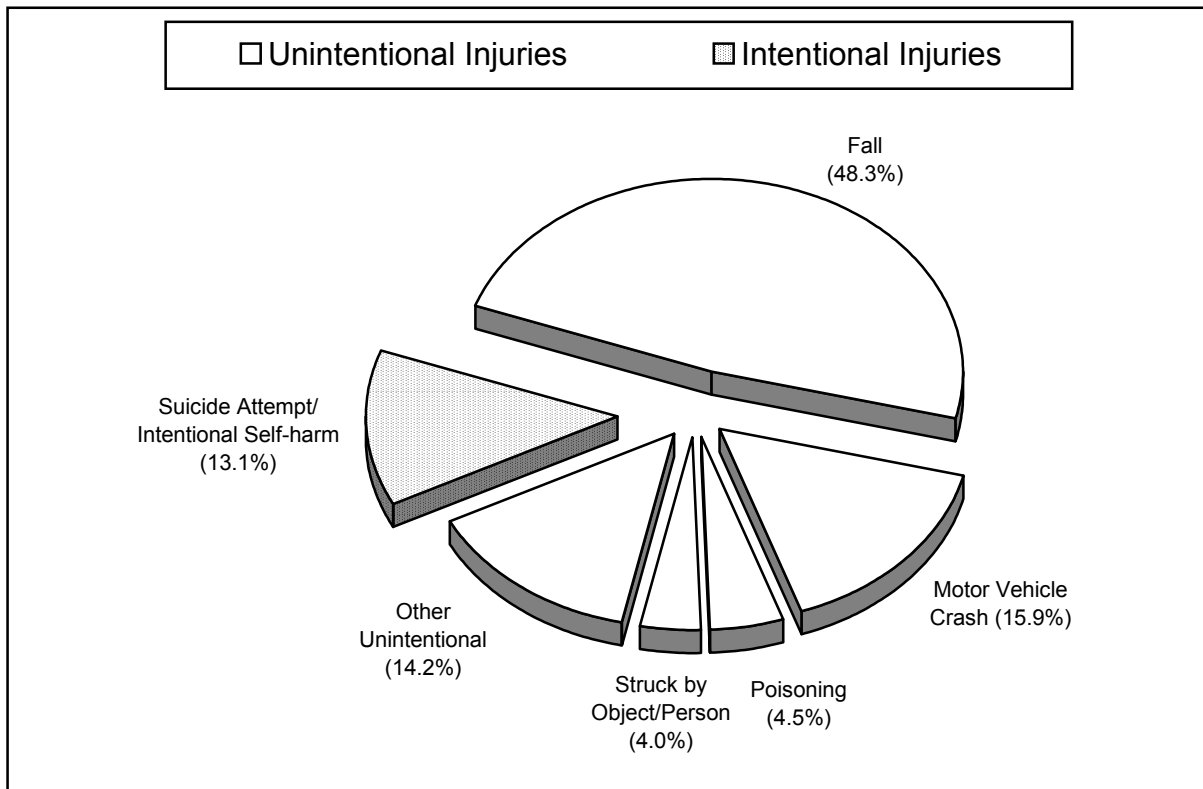
Age Group	Cause of Injury	No.	%	Rate
< 5	1. Unintentional Poisoning	73	21.5	116.1
	2. Unintentional Contact with Hot Object	62	18.3	98.6
	3. Unintentional Fall	59	17.4	93.8
	4. Assault	37	10.9	58.9
	5. Unintentional Motor Vehicle Crash	24	7.1	38.2
	All Causes ¹	339	100.0	539.2
5 - 14	1. Unintentional Motor Vehicle Crash	105	27.5	64.8
	2. Unintentional Fall	77	20.2	47.5
	3. Unintentional Poisoning	29	7.6	17.9
	4. Unintentional Struck by Object/Person	27	7.1	16.7
	5. Assault	22	5.8	13.6
	All Causes	382	100.0	235.9
15-24	1. Assault	355	39.0	270.6
	2. Unintentional Motor Vehicle Crash	251	27.6	191.3
	3. Suicide Attempt/Intentional Self-harm	75	8.2	57.2
	4. Unintentional Fall	51	5.6	38.9
	5. Unintentional Poisoning	25	2.7	19.1
	All Causes	911	100.0	694.4
25 - 44	1. Assault	778	34.6	290.7
	2. Unintentional Motor Vehicle Crash	440	19.6	164.4
	3. Unintentional Fall	280	12.4	104.6
	4. Suicide Attempt/Intentional Self-harm	183	8.1	68.4
	5. Unintentional Poisoning	150	6.7	56.1
	All Causes	2,249	100.0	840.4
45-64	1. Unintentional Fall	396	27.3	211.6
	2. Assault	273	18.8	145.8
	3. Unintentional Motor Vehicle Crash	256	17.7	136.8
	4. Unintentional Poisoning	159	11.0	84.9
	5. Suicide Attempt/Intentional Self-harm	77	5.3	41.1
	All Causes	1,450	100.0	774.7
65+	1. Unintentional Fall	789	68.3	807.6
	2. Unintentional Motor Vehicle Crash	96	8.3	98.3
	3. Unintentional Poisoning	72	6.2	73.7
	4. Assault	45	3.9	46.1
	5. Unintentional Fire/Flame	21	1.8	21.5
	All Causes	1,156	100.0	1,183.3

1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
U.S. Census Bureau, Population Estimates Branch

FIGURE 30
Causes of Injury Hospitalization
Wexford County Residents, 2001
(N = 176 E-coded cases)



E-coding rate for Wexford County: 95%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 49
Specific Causes of Injury Hospitalization
Wexford County Residents, 2001

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	85			Poisoning	22
MVC – Occupant	26			Suffocation/Hanging	1
Poisoning	8				
Struck by Object/Person	7				
Bite/Sting	3				
Fire/Flames	3				
Other	21				
Total	153	Total	0	Total	23

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 50
Leading Causes of Injury Hospitalization, by Age Group
Wexford County Residents, 2001
Cause of Injury Coding Rate: 95% (176 of 186 discharges)

Age Group	Cause of Injury	No.	%	Rate
< 5	1. Unintentional Bite/Sting	2	28.6	*
	All Causes ¹	7	100.0	377.8
5 – 14	1. Unintentional Fall	5	33.3	*
	2. Unintentional Motor Vehicle Crash	2	13.3	*
	2. Unintentional Struck by Object/Person	2	13.3	*
	All Causes	15	100.0	328.3
15 – 24	1. Suicide Attempt/Intentional Self-harm	7	41.2	171.4
	2. Unintentional Motor Vehicle Crash	3	17.6	*
	3. Unintentional Fall	2	11.8	*
	3. Unintentional Poisoning	2	11.8	*
	All Causes	17	100.0	416.4
25 – 44	1. Suicide Attempt/Intentional Self-harm	13	36.1	153.8
	2. Unintentional Motor Vehicle Crash	11	30.6	130.1
	3. Unintentional Fall	4	11.1	*
	4. Unintentional Fire/Flames	2	5.6	*
	4. Unintentional Struck by Object/Person	2	5.6	*
	All Causes	36	100.0	425.8
45 – 64	1. Unintentional Fall	15	53.6	205.6
	2. Unintentional Motor Vehicle Crash	7	25.0	95.9
	All Causes	28	100.0	383.8
65+	1. Unintentional Fall	58	79.5	1,323.6
	2. Unintentional Motor Vehicle Crash	5	6.8	*
	3. Unintentional Poisoning	3	4.1	*
	4. Unintentional Struck by Object/Person	2	2.7	*
	All Causes	73	100.0	1,665.9

1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
U.S. Census Bureau, Population Estimates Branch

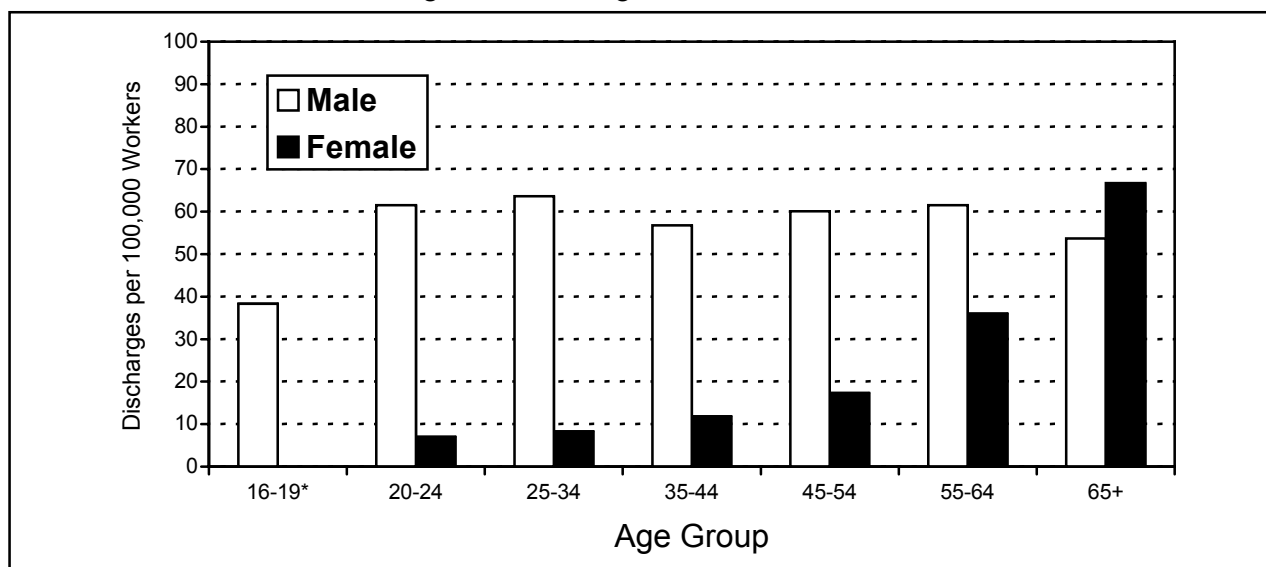
Occupational Injuries

Workers' compensation was listed as the primary payer for 1,873 (3.7%) of the 51,262 injury hospitalizations to Michigan residents aged 16 and older. This was nearly equivalent to the proportion (3.8%) found in the 1999 Michigan injury hospitalization study. Thirty eight (2.0%) of the 1,873 hospitalizations were hospitalized out of state.

Demographics of Injury Inpatients

Rates of work-related injury hospitalization by age and sex are illustrated in Figure 31. Rates were substantially higher for males than females for ages 16-54. While rates for males were fairly consistent after age 20, the rates for females increased with age and surpassed the rate for males for those aged 65 and older. This was similar to the pattern found in the 1999 Michigan injury hospitalization study.

FIGURE 31
Rate of Occupational Injury Hospitalizations
By Age and Sex
Michigan Residents Aged 16 and Older, 2001



* No rate was calculated for females aged 16-19 as there were less than six cases.

Occupational injury discharges were defined as those for which the primary payment source was workers' compensation.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
Bureau of Labor Statistics, U.S. Department of Labor, Local Area Unemployment Statistics

Table 51 illustrates hospitalization rates for occupational injury by county of worker residence. Rates ranged from 12.8 per 100,000 workers in Washtenaw County to 104.9 per 100,000 workers in Bay County. Of the five counties with the highest rates, four are contiguous to or near Saginaw Bay (Bay, Arenac, Tuscola, Iosco). Among Michigan's ten most populous counties, Genesee had the highest rate (59.4). Rates were not calculated for 26 counties that had less than six discharges. Due to this level of missing information, a map illustrating county-specific hospitalization rates was not developed.

TABLE 51
Number and Rate of Occupational Injury Hospitalizations
By County of Residence
Michigan Residents Aged 16 and Older, 2001

County	Number of Hospitalizations	Rate	County	Number of Hospitalizations	Rate
Alcona	2	*	Lapeer	21	48.8
Alger	0	-	Leelanau	4	*
Allegan	24	43.1	Lenawee	18	39.5
Alpena	8	53.7	Livingston	20	23.3
Antrim	2	*	Luce	1	*
Arenac	6	90.9	Mackinac	3	*
Baraga	0	-	Macomb	138	31.9
Barry	15	47.9	Manistee	6	56.3
Bay	55	104.9	Marquette	6	19.1
Benzie	5	*	Mason	10	71.4
Berrien	31	39.9	Mecosta	12	70.6
Branch	11	48.9	Menominee	3	*
Calhoun	15	24.1	Midland	17	40.0
Cass	5	*	Missaukee	2	*
Charlevoix	7	53.3	Monroe	53	72.2
Cheboygan	9	79.8	Montcalm	16	63.8
Chippewa	7	42.4	Montmorency	5	*
Clare	5	*	Muskegon	27	34.5
Clinton	10	28.1	Newaygo	14	71.0
Crawford	1	*	Oakland	152	22.6
Delta	8	43.8	Oceana	5	*
Dickinson	8	57.7	Ogemaw	7	80.2
Eaton	20	34.4	Ontonagon	1	*
Emmet	10	57.8	Osceola	4	*
Genesee	106	59.4	Oscoda	2	*
Gladwin	6	72.0	Otsego	11	84.6
Gogebic	0	-	Ottawa	45	32.5
Grand Traverse	20	45.9	Presque Isle	2	*
Gratiot	12	63.6	Roscommon	5	*
Hillsdale	10	43.8	Saginaw	39	40.6
Houghton	7	43.3	St. Clair	22	27.5
Huron	7	42.3	St. Joseph	15	48.0
Ingham	59	39.5	Sanilac	7	36.4
Ionia	18	67.7	Schoolcraft	2	*
Iosco	8	80.8	Shiawassee	14	43.1
Iron	5	*	Tuscola	21	81.5
Isabella	7	21.4	Van Buren	14	40.6
Jackson	31	40.7	Washtenaw	23	12.8
Kalamazoo	37	29.8	Wayne	389	43.7
Kalkaska	4	*	Wexford	2	*
Kent	108	33.9	Unknown	1	-
Keweenaw	1	*			
Lake	4	*	Michigan	1,873	38.3

* Reliable rate could not be calculated. See Methods.

Occupational injury discharges were defined as those for which payment source was workers' compensation.

Hospitalization rate is the number of hospitalizations per 100,000 workers.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

Bureau of Labor Statistics, U.S. Department of Labor, Local Area Unemployment Statistics

Types of Injuries Sustained

The types of occupational injuries requiring hospitalization are illustrated in Table 52. The table is a modified version of the more detailed Barell matrix (Table 2) (body region categories have been collapsed into more general categories). The predominant type of injury was a fracture: it was the principal diagnosis in 52.5% of all work-related injury hospitalizations. More than half of all fractures were to the lower extremities. Certain types of injuries were much more common among occupational injury inpatients than among all injury inpatients aged 16 and older: upper limb fractures (12.0% vs. 6.8%); sprains and strains (11.1% vs. 3.9%); open wounds (7.8% vs. 4.0%); and burns (6.0% vs. 1.6%). Conversely, hip fractures (4.2% vs. 18.3%) and poisonings (1.4% vs. 13.5%) were much less prevalent among occupational injuries.

Temporal Analysis

Table 53 and Table 54 illustrate the day of week and the month in which patients were admitted to the hospital with a work-related injury. Day of admission is not necessarily equivalent to day of injury incident, but in most cases it is probably a good marker for day of incident. Most admissions occurred on Tuesdays, while the least occurred on the weekend. The greatest number of admissions occurred in January.

TABLE 52
Number of Occupational Injury Hospitalizations
By Injury Type and Body Region
Michigan Residents Aged 16 and Older, 2001

Body Region	Fracture	Dislocation	Sprain/ Strain	Internal	Open Wound	Amputation	Blood Vessels	Contusion/ Superficial	Crush	Burn	Nerves	Unspecified	TOTAL
Brain/Skull	39			81							0		120
Other Head, Face, Neck	21	0	0		30		1	2	0	15	1	13	83
Spinal Cord	10			6									16
Vertebral Column	66	14	10										90
Torso	76	1	4	77	5		3	14	3	13	0	5	201
Upper Extremity	225	10	146		62	43	4	2	24	50	5	1	572
Lower Extremity	547	10	47		49	7	3	8	8	33		1	713
Other & Unspecified	0	0	1	0	0	0	0	0	0	1	0	1	3
System-wide & Late Effects													75
TOTAL	984	35	208	164	146	50	11	26	35	112	6	21	1,873

Injury categories were based on principal diagnosis.

The Barell Matrix illustrated in Table 2 utilized more specific body regions. Table C-2 in Appendix C illustrates the composition of the broader body regions listed above.

Occupational injury discharges were defined as those for which payment source was workers' compensation.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 53
Number of Occupational Injury Hospitalizations
By Day of Hospital Admission
Michigan Residents Aged 16 and Older, 2001

Day of Week	Number	%
Monday	303	16.2
Tuesday	369	19.7
Wednesday	321	17.1
Thursday	340	18.2
Friday	328	17.5
Saturday	142	7.6
Sunday	70	3.7
Total	1,873	100.0

TABLE 54
Number of Occupational Injury Hospitalizations
By Month of Hospital Admission
Michigan Residents Aged 16 and Older, 2001

Month of Admission	Number	%
January	197	10.5
February	156	8.3
March	172	9.2
April	149	8.0
May	177	9.5
June	148	7.9
July	133	7.1
August	171	9.1
September	131	7.0
October	173	9.2
November	135	7.2
December	131	7.0
Total	1,873	100.0

Occupational injury discharges were defined as those for which payment source was workers' compensation.
Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

APPENDIX A

Data Tables for Injury Hospitalizations to All Michigan Residents

TABLE A-1
Number and Rate of Injury Hospitalizations
By Age and Sex
Michigan Residents, 2001

Age	Male		Female		Total	
	Number	Rate	Number	Rate	Number	Rate
<1	239	350.9	163	251.0	402	302.1
1-4	816	301.3	519	200.9	1,335	252.3
5-9	751	204.0	431	123.1	1,182	164.5
10-14	1,149	296.0	619	167.8	1,768	233.6
15-19	2,137	578.6	1,268	361.3	3,405	472.7
20-24	2,251	663.4	986	296.4	3,237	481.7
25-29	1,891	599.5	849	271.1	2,740	435.9
30-34	1,891	528.4	1,047	293.8	2,938	411.3
35-39	2,320	602.6	1,276	330.0	3,596	466.0
40-44	2,532	627.9	1,459	354.7	3,991	490.0
45-49	2,218	591.7	1,372	357.8	3,590	473.4
50-54	1,855	565.5	1,174	346.8	3,029	454.4
55-59	1,278	513.2	1,044	402.4	2,322	456.7
60-64	1,042	559.6	1,066	529.9	2,108	544.2
65-69	995	662.4	1,218	694.8	2,213	679.9
70-74	1,127	817.1	1,809	1,053.6	2,936	948.3
75-79	1,353	1,255.7	2,784	1,814.6	4,137	1,584.0
80-84	1,299	1,958.9	3,269	2,870.5	4,568	2,535.1
85+	1,561	3,541.5	5,470	5,151.3	7,031	4,679.1
Total	28,705	584.6	27,823	545.9	56,528	564.9

Hospitalization rate is the number of hospitalizations per 100,000 population.

An injury discharge was defined as one with a principal diagnosis in the following range per ICD-9-CM⁹:
800.0-909.2, 909.4, 909.9, 910.0-994.9, 995.50-995.59, 995.80-995.89.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
U.S. Census Bureau, Population Estimates Branch

TABLE A-2
Number, Crude Rate and Age-Adjusted Rate of Hospitalizations for All Injury Types
By County of Residence
Michigan Residents, 2001

County	Number	Crude Rate	Age Adjusted Rate	County	Number	Crude Rate	Age Adjusted Rate
Alcona	81	695.4	614.4	Lapeer	453	506.2	549.7
Alger	60	611.2	542.7	Leelanau	98	455.1	404.2
Allegan	543	503.4	525.7	Lenawee	529	531.6	530.8
Alpena	198	633.7	586.3	Livingston	639	390.3	449.4
Antrim	132	562.2	506.8	Luce	42	595.0	*
Arenac	98	568.3	536.2	Mackinac	92	785.5	686.6
Baraga	64	731.8	698.0	Macomb	4,125	515.4	499.1
Barry	370	644.0	655.4	Manistee	146	588.7	535.7
Bay	943	859.7	813.8	Marquette	345	534.3	519.0
Benzie	95	577.1	535.0	Mason	192	673.5	614.1
Berrien	979	604.2	579.2	Mecosta	238	581.9	598.2
Branch	249	543.1	531.9	Menominee	173	685.7	617.0
Calhoun	802	580.4	566.6	Midland	459	547.9	554.1
Cass	290	565.6	554.5	Missaukee	69	468.1	450.0
Charlevoix	152	576.8	541.4	Monroe	900	608.4	628.7
Cheboygan	189	704.4	633.8	Montcalm	354	571.7	577.4
Chippewa	190	493.1	486.0	Montmorency	56	532.5	424.9
Clare	200	637.7	576.0	Muskegon	1,041	608.2	607.9
Clinton	303	461.2	485.8	Newaygo	275	564.2	563.0
Crawford	98	673.8	618.0	Oakland	5,754	478.8	496.1
Delta	272	708.0	640.8	Oceana	141	518.7	506.8
Dickinson	223	817.1	713.3	Ogemaw	132	608.1	555.1
Eaton	563	537.9	555.0	Ontonagon	65	840.7	669.0
Emmet	227	707.0	675.3	Osceola	137	587.8	571.7
Genesee	3,345	762.3	773.5	Oscoda	54	568.7	*
Gladwin	153	579.1	509.4	Otsego	125	525.7	517.1
Gogebic	104	587.4	489.2	Ottawa	987	405.3	440.6
Gd. Traverse	469	586.7	580.0	Presque Isle	90	625.9	531.6
Gratiot	280	661.5	642.6	Roscommon	150	582.7	506.4
Hillsdale	286	611.6	602.3	Saginaw	1,436	683.9	672.8
Houghton	247	691.0	675.6	St. Clair	835	502.3	505.7
Huron	210	588.5	504.3	St. Joseph	386	617.5	614.8
Ingham	1,443	514.5	566.4	Sanilac	233	523.4	493.5
Ionia	324	522.1	555.6	Schoolcraft	48	541.2	484.5
Iosco	209	768.0	640.6	Shiawassee	397	551.0	556.4
Iron	118	913.6	804.0	Tuscola	410	702.6	697.5
Isabella	257	402.2	466.3	Van Buren	403	525.2	530.9
Jackson	833	521.2	516.7	Washtenaw	1,336	405.7	474.5
Kalamazoo	1,260	525.8	547.0	Wayne	13,077	637.0	646.3
Kalkaska	94	558.4	546.3	Wexford	186	607.1	583.6
Kent	2,832	486.2	521.0	Unknown	44	-	-
Keweenaw	13	569.4	*				
Lake	78	671.9	621.2	Michigan	56,528	564.9	569.5

* Age-adjusted rate could not be calculated due to insufficient cell sizes.

Rates are the number of hospitalizations per 100,000 population.

An injury discharge was defined as one with a principal diagnosis in the following range per ICD-9-CM⁹:

800.0-909.2, 909.4, 909.9, 910.0-994.9, 995.50-995.59, 995.80-995.85.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

U.S. Census Bureau, Population Estimates Branch

TABLE A-3
Number and Rate of Hospitalizations for Traumatic Brain Injuries
By County of Residence
Michigan Residents, 2001

County	Number of Discharges	Discharge Rate	County	Number of Discharges	Discharge Rate
Alcona	11	94.4	Lapeer	43	48.0
Alger	5	*	Leelanau	1	*
Allegan	61	56.5	Lenawee	42	42.2
Alpena	9	28.8	Livingston	45	27.5
Antrim	10	42.6	Luce	2	*
Arenac	4	*	Mackinac	12	102.5
Baraga	9	102.9	Macomb	448	56.0
Barry	24	41.8	Manistee	13	52.4
Bay	82	74.8	Marquette	29	44.9
Benzie	3	*	Mason	21	73.7
Berrien	91	56.2	Mecosta	20	48.9
Branch	32	69.8	Menominee	13	51.5
Calhoun	87	63.0	Midland	42	50.1
Cass	27	52.7	Missaukee	7	47.5
Charlevoix	19	72.1	Monroe	100	67.6
Cheboygan	11	41.0	Montcalm	40	64.6
Chippewa	15	38.9	Montmorency	4	*
Clare	18	57.4	Muskegon	111	64.8
Clinton	38	57.8	Newaygo	25	51.3
Crawford	10	68.8	Oakland	535	44.5
Delta	20	52.1	Oceana	15	55.2
Dickinson	11	40.3	Ogemaw	10	46.1
Eaton	64	61.2	Ontonagon	6	77.6
Emmet	24	74.7	Osceola	14	60.1
Genesee	369	84.1	Oscoda	3	*
Gladwin	16	60.6	Otsego	14	58.9
Gogebic	4	*	Ottawa	100	41.1
Gd. Traverse	35	43.8	Presque Isle	11	76.5
Gratiot	27	63.8	Roscommon	15	58.3
Hillsdale	20	42.8	Saginaw	145	69.1
Houghton	27	75.5	St. Clair	80	48.1
Huron	16	44.8	St. Joseph	47	75.2
Ingham	190	67.7	Sanilac	25	56.2
Ionia	35	56.4	Schoolcraft	1	*
Iosco	14	51.4	Shiawassee	45	62.5
Iron	15	116.1	Tuscola	41	70.3
Isabella	24	37.6	Van Buren	39	50.8
Jackson	86	53.8	Washtenaw	116	35.2
Kalamazoo	140	58.4	Wayne	1,260	61.4
Kalkaska	9	53.5	Wexford	10	32.6
Kent	248	42.6	Unknown	8	-
Keweenaw	1	*			
Lake	7	60.3	Michigan	5,526	55.2

* Reliable rate could not be calculated. See Methods.

Hospitalization rate is the number of hospitalizations per 100,000 population.

Traumatic brain injuries were defined as discharges with a principal diagnosis in the following range per ICD-9-CM⁹: 800, 801, 803, 804, 850-854, 950(.1-.3), 995.55.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
U.S. Census Bureau, Population Estimates Branch

TABLE A-4
Number and Rate of Hospitalizations for Hip Fractures, Ages 65 and Older
By County of Residence
Michigan Residents, 2001

County	Number of Discharges	Discharge Rate	County	Number of Discharges	Discharge Rate
Alcona	16	563.6	Lapeer	86	987.4
Alger	13	760.2	Leelanau	25	655.8
Allegan	88	740.4	Lenawee	102	809.4
Alpena	35	645.0	Livingston	97	710.1
Antrim	25	613.6	Luce	10	931.1
Arenac	8	277.0	Mackinac	18	814.1
Baraga	8	577.2	Macomb	737	677.2
Barry	52	770.0	Manistee	25	557.7
Bay	104	641.7	Marquette	85	967.2
Benzie	24	837.1	Mason	29	609.8
Berrien	182	778.2	Mecosta	27	497.9
Branch	50	822.9	Menominee	33	758.3
Calhoun	118	623.8	Midland	70	686.3
Cass	33	475.0	Missaukee	11	511.2
Charlevoix	32	810.1	Monroe	116	702.2
Cheboygan	35	731.0	Montcalm	59	781.9
Chippewa	36	732.2	Montmorency	19	764.0
Clare	37	677.7	Muskegon	174	799.0
Clinton	51	710.0	Newaygo	48	770.8
Crawford	15	612.2	Oakland	973	715.2
Delta	57	866.9	Oceana	20	526.6
Dickinson	31	628.8	Ogemaw	18	434.0
Eaton	96	798.5	Ontonagon	18	1050.8
Emmet	32	698.1	Osceola	23	687.2
Genesee	373	722.9	Oscoda	10	523.0
Gladwin	32	652.5	Otsego	10	301.9
Gogebic	25	648.2	Ottawa	192	776.9
Gd. Traverse	73	696.8	Presque Isle	18	554.9
Gratiot	62	1077.9	Roscommon	30	487.7
Hillsdale	39	621.4	Saginaw	189	661.8
Houghton	47	870.0	St. Clair	138	677.8
Huron	37	529.3	St. Joseph	61	756.4
Ingham	185	696.3	Sanilac	49	713.0
Ionia	40	642.7	Schoolcraft	11	662.7
Iosco	40	671.3	Shiawassee	53	608.6
Iron	23	707.9	Tuscola	50	660.2
Isabella	36	616.1	Van Buren	59	627.8
Jackson	151	737.2	Washtenaw	191	705.9
Kalamazoo	200	727.1	Wayne	1462	595.0
Kalkaska	13	558.9	Wexford	31	707.4
Kent	434	722.4	Unknown	7	-
Keweenaw	0	-			
Lake	10	448.2	Michigan	8,382	683.3

Hospitalization rate is the number of hospitalizations per 100,000 population.

Hip fractures were defined as discharges with the principal diagnosis code 820 per ICD-9-CM.⁹

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
U.S. Census Bureau, Population Estimates Branch

APPENDIX B

Data Table for Occupational Injury Hospitalizations

TABLE B-1
Number and Rate of Occupational Injury Hospitalizations
By Age and Sex
Michigan Residents Aged 16 and Older, 2001

Age	Male		Female		Total	
	Number	Rate	Number	Rate	Number	Rate
16-19	59	38.3	3	*	62	20.4
20-24	155	61.5	16	7.0	171	35.6
25-34	354	63.6	40	8.3	394	37.9
35-44	418	56.8	72	11.8	490	36.4
45-54	347	60.1	95	17.3	442	39.2
55-64	155	61.5	77	36.0	232	49.8
65+	44	53.7	38	66.7	82	59.0
Total	1,532	58.7	341	14.9	1,873	38.3

* Reliable rate could not be calculated. See Methods.

Occupational injury discharges were defined as those for which payment source was workers' compensation.

Rates are the number of hospitalizations per 100,000 workers.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
Bureau of Labor Statistics, U.S. Department of Labor, Local Area Unemployment Statistics

APPENDIX C

Barell Injury Diagnosis Matrix

TABLE C-1
The Barell Injury Diagnosis Matrix, Classification by Body Region and Nature of the Injury

based on 5 digit icd-9 CM codes

			ICD-9-CM codes	FRACTURE 800-829	DISLOCATION 830-839	SPRAINS & STRAINS 840-848	INTERNAL 850-854,860-869 952, 995.55	OPEN WOUND 870-884, 890-894	AMPUTATIONS 885-887, 895-897	BLOOD VESSELS 900-904	CONTUSION/ SUPERFICIAL 910-924	CRUSH 925-929	BURNS 940-949	NERVES 950-951 953-957	UNSPECIFIED 959		
37	Traumatic Brain Injury	1	Type 1 TBI 800,801,803,804(.1-.4,.6-.9), (.03-.05,.53-.55) 850(.2-.4), 851-854, 950(.1-.3), 995.55	800,801,803,804(.1-.4,.6-.9) 800,801,803,804(.03-.05,.53-.55)	/	/	850(.2-.4) 851-854*, 995.55	/	/	/	/	/	/	950.1-.3	/		
		2	Type 2 TBI 800,801,803,804(.00,.02,.06,.09) (.50,.52,.56,.59) , 850(.0,.1,.5,.9)	800,801,803,804(.00,.02,.06,.09), 800,801,803,804(.50,.52,.56,.59)			850(.0,.1,.5,.9)										
		3	Type 3 TBI 800,801,803,804(.01, .51)	800,801,803,804(.01,.51)	/	/	/	/	/	/	/	/	/	/	/		
	Other head, face and neck	4	Other Head 873(.0-.1,.8-.9), 941.x6, 951, 959.01	/	/	/	/	873.0-.1,.8-.9	/	/	/	/	/	941.x6	951	959.01*	
		5	Face 802, 830, 848.0-.1, 872, 873.2-.7, 941(.x1,.x3-.x5,.x7)	802	830	848.0-.1	/	872, 873.2-.7	/	/	/	/	/	941.x1,.x3-.x5,.x7	/	/	
		6	Eye 870-871, 918, 921, 940, 941.x2, 950(.0,.9)	/	/	/	/	870-871	/	/	918, 921	/	940, 941.x2	950(.0,.9)	/	/	
		7	Neck 807.5-.6, 848.2, 874, 925.2, 941.x8, 953.0, 954.0	807.5-.6	/	848.2	/	874	/	/	/	925.2	941.x8	953.0, 954.0	/	/	
		8	Head, Face and Neck Unspecified 900, 910, 920, 925.1, 941.x0, .x9, 947.0, 957.0, 959.09	/	/	/	/	/	/	900	910, 920	925.1	941.x0,.x9, 947.0	957.0	959.09	/	
40	Spinal Cord (SCI)	9	Cervical SCI 806(.0-.1), 952.0	806.0-.1	/	/	952.0	/	/	/	/	/	/	/	/		
		10	Thoracic/ Dorsal SCI 806(.2-.3), 952.1	806.2-.3	/	/	952.1	/	/	/	/	/	/	/	/	/	
		11	Lumbar SCI 806(.4-.5), 952.2	806.4-.5	/	/	952.2	/	/	/	/	/	/	/	/	/	
		12	Sacrum Coccyx SCI 806(.6-.7), 952(.3-.4)	806.6-.7	/	/	952.3-.4	/	/	/	/	/	/	/	/	/	
		13	Spine+ Back unspecified SCI 806(.8-.9), 952(.8-.9)	806.8-.9	/	/	952.8-.9	/	/	/	/	/	/	/	/	/	
		Vertebral Column (VCI)	14	Cervical VCI 805(.0-.1), 839(.0-.1), 847.0	805.0-.1	839.0-.1	847.0	/	/	/	/	/	/	/	/	/	/
	15		Thoracic /Dorsal VCI 805(.2-.3), 839(.21,.31), 847.1	805.2-.3	839.21,.31	847.1	/	/	/	/	/	/	/	/	/	/	
	16		Lumbar VCI 805(.4-.5), 839(.20,.30), 847.2	805.4-.5	839.20,.30	847.2	/	/	/	/	/	/	/	/	/	/	
	17		Sacrum Coccyx VCI 805(.6-.7), 839(.41-.42), 839(.51-.52), 847.3-.4	805.6-.7	839(.41-.42, .51-.52)	847.3-.4	/	/	/	/	/	/	/	/	/	/	
	18		Spine+ Back unspecified VCI 805(.8-.9), 839(.40,.49), 839(.50,.59)	805.8-.9	839(.40,.49,.50,.59)	/	/	/	/	/	/	/	/	/	/	/	
	Torso		19	Chest (Thorax) 807(.0-.4), 839(.61,.71), 848(.3-.4), 860-862, 875, 879(.0-.1), 901, 922(.0-.1,.33), 926.19, 942.x1-.x2 953.1	807.0-.4	839.61,.71	848.3-.4	860-862	875, 879.0-.1	/	901	922(.0,.1,.33)	926.19	942.x1-x2	953.1	/	/
		20	Abdomen 863-866, 868, 879(.2-.5), 902(.0-.4), 922.2,942.x3, 947.3, 953(.2,.5)	/	/	/	863-866, 868	879.2-.5	/	902.0-.4	922.2	/	942.x3, 947.3	953.2, 953.5	/	/	
21		Pelvis & Urogenital 808, 839(.69,.79), 846, 848.5, 867,877-878 902(.5,.81-.82), 922.4, 926(.0,.12), 942.x5,947.4, 953.3	808	839.69,.79	846, 848.5	867	877-878	/	902(.5, .81-.82)	922.4	926(.0,.12)	942.x5, 947.4	953.3	/	/		
22		Trunk 809, 879(.6-.7), 911, 922(.8-.9), 926(.8-.9), 942(.x0,.x9), 954(.1,.8-.9), 959.1	809	/	/	/	879.6-.7	/	/	911, 922.8-.9	926.8-.9	942.x0, 942.x9	954.1, .8-.9	959.1	/		
23		Back and Buttock 847.9, 876, 922(.31-.32), 926.11, 942.x4	/	/	847.9	/	876	/	/	922.31-.32	926.11	942.x4	/	/	/		
44		Upper	24	Shoulder & upper arm 810-812, 831, 840, 880, 887(.2-.3), 912,923.0, 927.0, 943(.x3-.x6) ,959.2	810-812	831	840	/	880	887.2-.3	/	912, 923.0	927.0	943.x3-.x6	/	959.2	
	25		Forearm & elbow 813, 832, 841, 881(.x0-.x1), 887(.0-.1), 923.1, 927.1, 943(.x1-.x2)	813	832	841	/	881.x0-x1	887.0-.1	/	923.1	927.1	943.x1-x2	/	/		
	26		Wrist, hand & fingers 814-817, 833-834, 842,881.x2, 882, 883, 885-886, 914-915, 923(.2-.3), 927(.2-.3), 944, 959(.4-.5)	814-817	833, 834	842	/	881.x2,882, 883	/	/	914-915, 923.2-.3	927.2-.3	944	/	959.4-.5		
	27		Other & unspecified 818, 884, 887(.4-.7), 903, 913, 923(.8-.9), 927(.8-.9), 943(.x0,.x9), 953.4, 955, 959.3	818	/	/	/	884	887.4-.7	903	913,923.8,.9	927.8-.9	943.x0,.x9	953.4, 955	959.3	/	
	28		Hip 820, 835, 843, 924.01, 928.01	820	835	843	/	/	/	/	924.01	928.01	/	/	/	/	
	29		Upper leg & thigh 821, 897(.2-.3), 924.00, 928.00, 945.x6	821			/	/	897.2-.3	/	924.00	928.00	945.x6	/	/	/	
	Lower	30	Knee 822, 836, 844.0-.3, 924.11, 928.11, 945.x5	822	836	844.0-.3	/	/	/	/	924.11	928.11	945.x5	/	/	/	
		31	Lower leg & ankle 823-824, 837, 845.0, 897(.0-.1), 924(.10,.21), 928(.10,.21), 945(.x3-.x4)	823-824	837	845.0	/		897.0-.1	/	924.10,.21	928.10,.21	945.x3-.x4	/	/	/	
		32	Foot & toes 825-826, 838, 845.1, 892-893, 895-896, 917, 924(.3,.20), 928 (.3,.20), 945 (.x1-.x2)	825-826	838	845.1	/	892-893	895-896	/	917, 924.3,.20	928.3,.20	945.x1-.x2	/	/	/	
		33	Other & unspecified 827,844(.8-.9), 890-891, 894, 897(.4-.7), 904(.0-.8), 916, 924(.4-.5), 928(.8-.9), 945(.x0,.x9), 959.6-.7	827	/	844.8,.9	/	890-891,894	897.4-.7	904.0-.8	916, 924.4-.5	928.8,.9	945.x0-.x9	/	959.6-.7	/	
		System-wide & late effects	34	Other/ multiple 819, 828, 902(.87,.89), 947(.1-.2), 953.8, 956	819, 828	/	/	/	/	/	902.87,.89	/	/	947.1-.2	953.8, 956	/	/
			35	Unspecified site 829, 839(.8-.9), 848(.8-.9), 869, 879(.8,.9), 902.9, 904.9, 919, 924(.8,.9), 926(.8,.9), 946, 947(.8,.9), 948, 949, 953.9, 957(.1,.8,.9), 959(.8,.9)	829	839.8-.9	848.8-.9	869	879(.8-.9)	/	902.9, 904.9	919, 924.8,.9	929	946, 947.8,.9 948, 949	953.9, 957.1,.8,.9	959.8,.9	/
36	System-wide & late effects 905-908, 909 (.0,.1,.2,.4,.9), 930-939,958, 960-994, 995.50-.54,.59, 995(.80-.85)		Foreign body (930-939), Early complications of trauma (958), Poisoning (960-979), Toxic Effects (980-889), Other and unspecified effects of external cause (990-994) Child and adult maltreatment (995.50-.54,.59, 995.80-.85) Late effects of injuries, poisonings, toxic effects and other external causes (905-909) excluding 909(.3, .5)														

Special diagnostic codes for trauma: Flail Chest (807.4) Pneumothorax (860)

For purposes of classification, head injuries are labeled as **Type 1 TBI** if there is recorded evidence of an intracranial injury or a moderate or a prolonged loss of consciousness (LOC), Shaken Infant Syndrome (SIS), or injuries to the optic nerve pathways.

Type 2 TBI includes injuries with no recorded evidence of intracranial injury, and LOC of less than one hour, or LOC of unknown duration, or unspecified level of consciousness. **Type 3 TBI** includes patients with no evidence of intracranial injury and no LOC.

* **Note from CDC:** 959.01 (added to ICD-9-CM in 1997) is not intended to be assigned to TBI cases; however, in the USA it has been assigned incorrectly to a substantial proportion of cases previously coded 854.

The Matrix is available on the net at www.cdc.gov/nchs/about/otheract/ice/barellmatrix.htm

Table C-2
Specific Injury Types Comprising
Barell Injury Diagnosis Matrix Categories Used in Table 2

Body Region	Injury Types Comprising Category
Brain/Skull	<ul style="list-style-type: none"> • Type 1¹ Traumatic Brain Injury • Type 2² Traumatic Brain Injury • Type 3³ Traumatic Brain Injury
Other Head, Face, Neck	<ul style="list-style-type: none"> • Other Head • Face, Eye, Neck • Head, Face and Neck, Unspecified
Spinal Cord	<ul style="list-style-type: none"> • Cervical Spinal Cord Injury • Thoracic/Dorsal Spinal Cord Injury • Lumbar Spinal Cord Injury • Sacrum Coccyx Spinal Cord Injury • Spine & Back, Unspecified Spinal Cord Injury
Vertebral Column	<ul style="list-style-type: none"> • Cervical Vertebral Column Injury • Thoracic/Dorsal Vertebral Column Injury • Lumbar Vertebral Column Injury • Sacrum Coccyx Vertebral Column Injury • Spine & Back, Unspecified Vertebral Column Injury
Torso	<ul style="list-style-type: none"> • Chest (Thorax) • Abdomen • Pelvis & Urogenital • Trunk • Back and Buttock
Upper Extremity	<ul style="list-style-type: none"> • Shoulder & Upper Arm • Forearm & Elbow • Wrist, Hand & Fingers • Other & Unspecified Upper Extremity
Lower Extremity	<ul style="list-style-type: none"> • Hip • Upper Leg & Thigh • Knee • Lower Leg & Ankle • Foot & Toes • Other and Unspecified Lower Extremity
Other & Unspecified	<ul style="list-style-type: none"> • Other/multiple • Unspecified Site
System-wide & Late Effects	<ul style="list-style-type: none"> • System-wide & Late Effects

1. Recorded evidence of an intracranial injury or a moderate or prolonged loss of consciousness (LOC), Shaken Infant Syndrome (SIS), or injuries to the optic nerve pathways.

2. No recorded evidence of intracranial injury, and LOC of less than one hour, or LOC of unknown duration, or unspecified level of consciousness.

3. No evidence of intracranial injury and no LOC.

APPENDIX D

Cause and Manner/Intent of Injury and Corresponding E-codes

TABLE D-1 (Page 1 of 2)
ICD-9-CM Codes Defining Cause and Manner/Intent of Injury Categories

Mechanism	Manner/Intent				
	Unintentional	Intentional Self-harm	Assault	Undetermined	Other
Cut/pierce	E920	E956	E966	E986	E974
Drowning/submersion	E830, E832, E910	E954	E964	E984	
Boat-related	E830, E832				
Non-boat-related	E910				
Boat-related non-drowning*	E831				
Fall	E880-E886, E888	E957	E968.1	E987	
Fire/hot objects or substances	E890-E899, E924	E958.1,.2,.7	E961, E968.0,.3	E988.1,.2,.7	
Fire/flame	E890-E899	E958.1	E968.0	E988.1	
Hot object/substance	E924	E958.2,.7	E961, E968.3	E988.2,.7	
Firearm	E922.0-.3, .8, .9	E955.0-.4	E965.0-.4	E985.0-.4	E970
Machinery	E919				
Motor vehicle traffic	E810-E819	E958.5	E968.5	E988.5	
Occupant	E810-E819(.0,.1)				
Motorcycle	E810-E819(.2,.3)				
Pedalcyclist	E810-E819(.6)				
Pedestrian	E810-E819(.7)				
Other specified	E810-E819(.4,.5,.8)				
Unspecified	E810-E819(.9)				
Pedalcyclist, other	E800-E807(.3), E820-E825(.6), E826.1,.9,E827-E829(.1)				
Pedestrian, other	E800-E807(.2), E820-E825(.7), E826-E829(.0)				

* This cause is contained within "Other Transport" in the framework provided by the U.S. Centers for Disease Control and Prevention.¹³ It was separated out for this report due to state-specific interest in boat-related non-drowning injuries.

TABLE D-1 (Page 2 of 2)
ICD-9-CM Codes Defining Cause and Manner/Intent of Injury Categories

Mechanism	Manner/Intent				
	Unintentional	Intentional Self-harm	Assault	Undetermined	Other
Snowmobile, non-traffic*	E820				
Transport, other**	E800-E807(.0,.1,.8,.9), E821-E825(.0-.5,.8,.9), E826.2-.8, E827-E829(.2-.9), E833-E845	E958.6		E988.6	
Natural/environmental	E900-E909, E928.0-.2	E958.3		E988.3	
Bites & stings	E905(.0-.6,.9), E906(.0-.5,.9)				
Other	E900-E904, E905.7,.8, E906(.6-.8), E907-E909, E928.0-.2				
Overexertion	E927				
Poisoning	E850-E869	E950-E952	E962	E980-E982	E972
Struck by, against	E916-E917		E960.0, E968.2		E973, E975
Suffocation, strangulation	E911-E913	E953	E963	E983	
Other specified & classifiable	E846-E848, E914-E915, E918, E921, E922.4, E923, E925-E926, E928.3, E929.0-.5	E955.5, .6, .9, E958.0,.4	E960.1, E965.5-.9, E967, E968.4, .6, .7	E985.5, .6, E988.0,.4	E971, E978, E990-E994, E996, E997.0-.2
Other specified, not elsewhere classifiable	E928.8, E929.8	E958.8, E959	E968.8, E969	E988.8, E989	E977, E995, E997.8, E998, E999
Unspecified	E887, E928.9, E929.9	E958.9	E968.9	E988.9	E976, E997.9
Adverse effects/events***					E870-E879, E930-E949
Medical care					E870-E879
Drugs					E930-E949

* This cause is contained within "Other Transport" in the framework provided by the U.S. Centers for Disease Control and Prevention.¹³ It was separated out for this report due to state-specific interest in snowmobile injuries.

** The framework provided by the U.S. Centers for Disease Control and Prevention includes boat-related non-drownings and snowmobile, non-traffic incidents in this category. These injury causes have been separated out for this report.

*** Adverse effects are part of the CDC framework. However, per the recommendations of the national panel on using hospital discharge data,¹⁰ adverse effects were excluded from calculations of E-coding rates and in all cause of injury analyses.

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